

U-61B
1921/22

BIENNIAL REPORT
of the
Board of Trustees
of the
Agricultural College
of Utah

THE LIBRARY OF THE
MAR 9 1931
UNIVERSITY OF UTAH

For the Years 1921 and 1922

ARROW PRESS
Salt Lake City, Utah

THE LIBRARY OF THE
MAR 9 1931
UNIVERSITY OF UTAH

THE BIENNIAL REPORT OF THE BOARD OF TRUSTEES

of the

Agricultural College of Utah

For the Years 1921 and 1922

To the Governor and Legislative Assembly:

Ladies and Gentlemen: In accordance with law I herewith transmit, on behalf of the Board of Trustees of the Utah Agricultural College, the Biennial Report for the years 1921 and 1922, together with estimates and recommendations for the maintenance of the Institution for the coming biennium.

The College has gone through the period of readjustment following the war without serious injury to date, although most rigid economies are necessarily enforced. Among these economies were the reduction in the teaching force and the limitation of departmental expenditures for supplies and equipment. Such action while necessary to meet financial conditions was severe by way of interference with the proper conduct of the work. However the Institution is now through the worst stage of the period of depression and with careful administration and recognition of our needs by the Legislature we shall continue to perform the great functions assigned to us by the State and Nation.

I desire to call attention of the Legislature to the fact that the estimates of the College are based upon actual needs. No provision has been made in these estimates for what is sometimes considered the inevitable cutting down by the State officials. Any reduction in our estimates will seriously injure our work. We desire to have the Governor and Legislature know that, in justice to them, our costs have already been reduced to the point

where we feel they will not desire to reduce them further. The full detail of the Institution's work and expenditures is included in the report of the President of the College which is attached hereto. This report reveals that the College is functioning admirably, in its two-fold work of teaching students who are to become our future leaders and in directly serving the people of the State through the Experiment Station and the Extension Division.

In the professional fields the College has a more limited curriculum than any other Agricultural College in America, excepting only the Massachusetts Agricultural College which is located in the midst of numerous rich endowed colleges and therefore has not our need of wide training facilities. In harmony with development in all the other colleges our own Institution should give degrees in mechanical and civil engineering. This could easily be done because under Federal law we are required to maintain extensive shops and equipment so that the equipment is already at the College for mechanical engineering work. Our work in training irrigation and agricultural engineers has supplied us with both equipment and teaching force necessary to give training in civil engineering. We should therefore be authorized to give degrees in these courses.

The College deals fundamentally with rural life in all its educational, industrial, and social phases. At this time due to economic adjustments, the College can and is rendering very valuable service in developing our agriculture. As it has grown over the past third of a century in our State, we feel that the College has done and is doing work of both economic and social value many times greater than the investment in it by our tax payers. It should be remembered that the College receives in all its work a considerable share of its income from the Federal Government. This Federal co-operation is both a great saving to Utah and a distinction to the Institution of which we are very proud.

The Board of Trustees recommends the attached report to the careful consideration of the Governor and Legislature. The requests for appropriations we endorse in their entirety, feeling that the College, in a large sense is a wealth producer not a wealth consumer. At the same time we deeply sense the necessity of curtailing expenses to the lowest possible limit to relieve, as far as possible, a tax paying public already overburdened.

The College is an institution devoted to the ideals of our State and Nation. There are here few if any of the oddities or questionable extremes frequently so prominent in education. Furthermore the College is sound morally which at this time particularly in the history of our civilization is more to be desired than any achievement otherwise. Logan is an ideal location for the training of our youth, being both modern in its sanitary and living facilities and most cleanly in all respects. The Board of Trustees appreciates the constant attitude of cordial support which has come from the Governor and Legislature.

Very respectfully,

A. W. IVINS,

President of the Board of Trustees.

Biennial Report of the President

1921, 1922

To the Board of Trustees of the
Utah Agricultural College:

I have the honor to submit herewith the report of the Utah Agricultural College for the biennium of 1921 and 1922, the report also including estimates for the ensuing two years. These estimates have, according to law, been submitted to the State Department of Finance and Purchase. You will find in the following pages the separate reports of the different administrative and instructional units of the College as follows:

- The Schools of the College
- The Utah Experiment Station
- The Extension Division
- The Branch of the College
- The Departments of Instruction
- The Dean of Women
- The Medical Supervisor
- Boy Scout Activity
- The Library
- The Departments of
 - Grounds and Greenhouses
 - College Farm
 - Buildings
 - Water, Heat, Light and Sewerage
- The State Power Plant
- The Office of the Purchasing Agent
- The Office of the Financial Secretary

The Industrial Condition

Of first consideration at this time, in all branches of human activity, is the industrial condition. The industrial crisis, if it may so be called, precipitated by the sensational drop in practically all prices, and especially in the price of crops and live-stock, occurring in 1920, is still the most important problem confronting agriculture.

There has been since 1920 considerable recovery in livestock but aside from a few products the general level of farm prices is far below the general standard of wages and of prices paid for other commodities. Obviously there must be either a rise in farm values or a decline in the things the farmer must buy, including freight rates. If one of these two things does not occur the only economic alternative is desertion of the farm by the superior people and the reversion of our lands to a peasant and inferior population. This latter condition is so at variance with fundamental American policy that it seems improbable that it can occur. Yet it is obvious that a reasonably quick remedy must be applied to our economics otherwise this will occur.

Farm Problems Ignored

The obvious national policy due to increasing land values which protected the farmer even when prices failed, has been one of ignoring the great agricultural problems which now, because free or even cheap land is no longer available and land values are now lowering rather than rising, press for solution. The farmer must now make his earning from the producing power of his land rather than in the increase in land values. This probably is a natural course for events to take. It seems apparent that national political forces are aware of the crisis and are doing what seems feasible to effect a remedy. The seriousness of the problem can be appreciated when it is remembered that no nation of the past has been able to build a great agriculture upon democratic principles. The agriculture of Rome was based upon slavery, that of Russia upon an ignorant peasantry. Modern European nations almost without exception have been characterized by an urban brilliance at the sacrifice of rural prosperity and enlightenment. Until the present depression came, our own nation was going the way of all these of the past. Denmark alone among modern nations has produced an intelligent and contented rural population based upon both political and industrial democracy.

First Remedy Improved Farming

It is possible to state at least in general terms the national readjustments that must be made if we are to avoid the state and national decay which inevitably follows

rural degeneration. These adjustments must begin on the farms themselves. There must be a more efficient production and a husbanding of resources. The principles of business management must be applied to agriculture to a much more general degree than at present. Many pure theorists mistake the nature of agriculture in assuming that it is exclusively a business. The form is both a business and a home differing in this regard from banking, merchandising or any similar vocation. But granting this, it nevertheless is true that to that part of it which is business the principles of business should be applied.

Business Farming

A record of the costs of production is necessary if a farm is to succeed in the competition which now faces the industry, and a careful adjustment should be made of the farm business to harmonize it with existing markets and with costs. In other words the farm should produce what the available market needs and will pay a profitable price for. With accurate business administration of the farm, should of course always go improvement in methods of tillage, control of pests, drainage, efficient use of irrigation water, use of improved seed, higher breeding of livestock and the hundred other difficult tasks of intelligent farming.

Co-operation an Urgent Necessity

The necessity of co-operation is now so apparent that little need be said of it except that its absence is a lamentable weakness in our present methods. Rapid strides however are being made and the day is not far distant when growers as intelligent as ours will not only systematically and efficiently produce their crops and animals but they will scientifically sort, grade and store their products, releasing them to the markets when the markets will pay, and gladly so, a good price for them. Now our method is to dump seasonally practically our whole tonnage upon the buyers. The market naturally is demoralized except during periods of under-production. While co-operation is the most needed improvement, it is at the same time the most difficult of attainment. It presumes a high degree of character and intelligence on the part of farmers, qualities which fortunately we in

Utah feel we have in abundance in our producers. Systematic production, with known needs of the buying public in mind, together with storage, thus making it possible to release the crops when needed, are early realizations I feel in Utah agriculture.

A New Program in Agriculture

The collapse of foreign markets and the probable long delay in their recovery sufficient to meet our conditions force us to analyze our markets near at hand. The College is now systematically investigating the consuming power of the nearby centers which have lately assumed such proportions in our commerce. Just what does Los Angeles, San Francisco, Butte, and the other Montana centers, Pocatello, Ogden, Salt Lake City, Wyoming points, and similar areas, consume which we can produce? An establishment of the facts as indicated will reveal a large share of our most profitable market. Knowing the market, the more difficult task is to adjust our production to meet it. Such adjustment, however, is forced upon us and the very necessity may be our making. There is no reason why we cannot, through our Farm Bureau organization, measurably regulate the nature of production to suit the needs of the many millions about us who desire to buy.

Indeed this is old Pioneer policy and the fact that we have done it before (on a small scale it is true) leads one to feel confident that it can be done again. Our people are already trained in such cooperation. If the issues can be clearly defined, the problem clearly stated, they will respond. Our motto for the next decade should be to produce for the increasing millions near at hand and release to the world markets only those things (and in aggregate of course they will be large) which by fortunate combinations of circumstances we can produce profitably in spite of our high freight rates and distance from large eastern markets. It is conservative to say that millions can be saved to Utah each year, once this policy is established and diligently applied.

Education

Prerequisite to the successful consummation of this great program must be a state-wide campaign of education in regard to the facts. This campaign of education must,

of course, not only cover our relationship to the market but must continuously emphasize the necessity of a standardized production, itself a task of tremendous difficulty. Every device must be used to influence the producers as to the essential principles involved. Utah with its trained leadership already available in even the most remote parts of the state can well do this pioneering for the nation to our own great credit and profit. It will need something of the spirit of the Pioneers in it if it is to succeed, however, and that spirit comes only of men and women of industry, intelligence, and great vision. And along with these matters of converting a whole state, must go increasing attention to agriculture as a science and an art.

The Function of County Agents

There is in our new agriculture an even greater function for county agents and home demonstrators than they have before performed, great as have been their achievements in the past. The county agents particularly are being and will continue to be effective in the economic developments immediately ahead. I quote from the Secretary of Agriculture in defining the functions of these agents: their work, the Secretary says, "covers the whole field of economic production, economic marketing, and farm and home development." Their functions thus defined, county agents will become, increasingly, the most potential single factor in not only the important problems of agricultural production but they will and are functioning and will of necessity pay more attention to this phase of our work in the future in a most important way in the marketing of farm products. The Utah Agricultural College conceives its greatest task to be that of aiding the farmers of the state. It is approaching the present problem feeling that it was for just such work that the Institution was created.

Farm prosperity will not be completely restored and farm development will not proceed as it should until other things than those mentioned have been accomplished. There will undoubtedly be better credit arrangements perfected in the near future whereby the deserving grower will be able to secure funds at three or four percent less than often he is now forced to pay, and this credit on long time loans to suit his conditions. Indeed through banking institutions already organized, governmental or

semi-governmental in nature, such credit is now being developed, with prospects of expansion on economically sound basis, under government regulation. Our present facilities are quite largely for mercantile purposes, and not suitable for farm purposes, the farmer receiving his income at different times and with not the same frequency as the merchant. Of the utmost urgency is the matter of freight rates for farm products which now limit commercial production of certain of our bulkier crops. There are other adjustments coming, of relief to the farmer by way of taxes, road development, and other rural improvements which combined will again restore agriculture to its fitting place as the basic and most indispensable industry.

Superior People on the Farm

The policy of Utah from its beginning cannot be too strongly stressed at this time, which is the policy of encouraging the strong, mentally and morally, rather than the weak, to own the lands of the state and produce the food. As a means of securing national sanity nothing is more important than this. Farming, even now with its obvious economic short-comings, is a business for our best citizens and such should be encouraged to go into it. In the history of modern civilization, the cause of social decay has been accompanied, if not caused, by the building of great cities and the drawing to these cities of the better citizens leaving only the indigent and inferior behind. But people obviously will not go onto farms for the rather vague purpose of saving our civilization. This purpose is too remote. The business of farming must be established as economically sound a paying thing, or people will desert it. Right now, it is conceivable, is the most opportune time for the right kind of people to strengthen themselves upon the land. The wave now is away from the land which itself provides an unusual opportunity because it will create additional opportunities on the farm. The profits are going to be ample and the other rewards of farm life by way of normal individual and family life are beyond price. To our own young people in Utah it should be most strongly said now that farming in the years to come will amply repay them for their investment in it. "Stay with the land," might well be the cry to our superior young people. Let the cities absorb, with a natural and goodly share of our best, their due proportion of our weak-

lings. The future of the state depends upon adherence now to the policy of a superior rural population.

College Plans Await Prosperity

Many plans for the development of the work of the College must necessarily await the return of a larger earning power to our taxpayers. An institution should grow only as the demand for growth is apparent. The College should be as small as is consistent with its ability to accomplish the functions assigned to it by the State. There is positive danger in the cry for larger institutions. They should be kept as small as possible consistent with their obligations. The College now is in need of a number of larger additions to its equipment and of additions to its staff, to accommodate the ever-increasing number of students seeking instruction. All of these with minor exceptions must be held in abeyance however, until financial conditions are better. The College was very fortunate in being able to take advantage of Federal funds available under soldier training contracts during the war to build much needed laboratories for certain phases of our work. The State and Federal funds were combined to complete for our permanent use excellent laboratories and class rooms, instead of spending available funds upon temporary barracks building which now would have been quite valueless. Our most important needs now are for library facilities including a library building adequate to our standing among institutions of the country, and for adequate dormitories to house our students. We greatly need additional land for use of the College and the Experiment Station. It would undoubtedly be a good investment for the State to buy while land is comparatively cheap, one hundred or more acres of better land near the College. This could be obtained now for from twenty-five to thirty thousand dollars. Later it will be worth more than this. There is also urgent need for laboratory desks, microscopes, and chemical equipment in the departments of botany, agronomy, bacteriology, chemistry and zoology. Our laboratories in chemistry, horticulture and in auto and tractor work are inadequate to take care of the students in these courses. We consider, however, that the abandonment of some of these courses for the time, deplorable as that would be, would be preferable to asking an already overburdened tax-paying public to construct an additional laboratory building at this time. These needs together with the need of a commodious armory, to provide

training for our Reserve Officers Training Corps and storage for approximately one hundred fifty thousand dollars worth of government equipment, must and should be carried over to more prosperous times.

Chamber of Commerce Apartments

During the summer and fall of 1921 the housing shortage in Logan became especially acute. Students, unable to secure accommodations, were leaving town. The situation was called to the attention of the Logan Chamber of Commerce which immediately took action resulting in the complete equipment of a twenty-one suite apartment house, consisting of forty-eight modern rooms, on the College Campus. The Chamber raised a fund of \$25,000 for this purpose, which ultimately, after payment through rentals, becomes a gift to the College. Such action by the Chamber of Commerce is indicative of the excellent spirit of co-operation which exists between the College and the citizens of Logan.

Scholarship High

It is gratifying to record that the College has assumed place in scholarship with the better institutions of America. This achievement is evidenced by the organization at the College of various national honor societies, this College it is interesting to note being the first in Utah to receive recognition from a national scholarship society. There are now six national scholarship or honor organizations which have been established at the College in recent years. In formal training, as evidenced by degrees, the College faculty is unexcelled in western America, speaking in a proportionate way. The contribution of the faculty in text books, scientific articles in the national journals, and publications within the Institution is increasing in volume and quality. This scholarly output has placed the Institution most favorably before the world. The best evidence of scholarship, however, is in the results as represented in the students. Here I may be pardoned for saying with enthusiasm that the record of the students of the College places them on a very high plane. There is among them a real love of learning and an apparent ability to differentiate between the many interesting but inane things which have fastened themselves upon many institutions, and the functioning body of truth which goes into the work of the world. There is among the students

of the College a serious regard for their obligations. The graduates almost universally have brought credit to the Institution by virtue of the leadership which they have assumed particularly in the western states. Throughout these states it is safe to say that the College through these graduates is exercising a very desirable influence. The serious attitude of the students of the College toward their work eliminates any appreciable problems of discipline, problems frequently very pressing in colleges. I desire to record this expression of the pride of the College in its students.

The Field of Work of the College

The College is different from many institutions in that it is both academic and industrial in its function. Approximately one-half the income and energy of the College goes into the academic work of the Institution, that is, into the teaching of students. The other half goes into a direct service to the farmers, house-keepers, business men and citizens in general, through the Experiment Station and the Extension Division. This fact should not be lost sight of because it explains the purpose of the creation of the College. Our work is not done until the principles taught and discovered are incorporated in the industry of the State. In this sense we cannot be looked upon exclusively as a class room institution; our function is more intimate in relation to human needs. The College is an educational-social agency developed to effect citizenship and industry.

For administrative purposes the College is divided in its teaching into six divisions or schools as follows: (1) The School of Agriculture, (2) The School of Home Economics, (3) The School of Agricultural Engineering, (4) The School of Mechanical Arts, (5) The School of Commerce and Business Administration, and (6) The School of General Science. Each of these Schools is under the direction of a Dean, this organization being established by Board action effective for the first time during the year 1922-23. The Utah Agricultural College, alone among all the Agricultural Colleges of America except one, does not now offer degree courses in mechanical and civil engineering. In view of the fact that such work could be given at the College at this time without the incurring of any additional expense, both equipment and faculty being already at the College for work in mechanic arts and agricultural engineering, it is urged as very desirable that degree courses be authorized in these branches of work.

Under Federal statute we are required to maintain extensive equipment in mechanic arts and agricultural engineering which provides excellent facilities for training in mechanical and civil engineering.

Teacher Training

The last Legislature formally established work in Education and Pedagogy at the College. This work has immediately assumed great importance. The field of usefulness of the Department of Education, however, has only begun to be developed. Utah still imports from the outside many hundreds of teachers each year. Here is a profitable and desirable opportunity for our own young people of which advantage should be taken. The influence of good teachers in our State cannot be overestimated. It is doubtful if any factor contributes more to the life of the State than the quality of teaching done in the elementary and secondary schools. Obviously the teachers should be not only people of superior native ability but should be well trained in their very important calling.

The Experiment Station

The Experiment Station and the Extension Division constitute the other half of the Institution's work. It is difficult to overestimate the amount of good being accomplished for the farmers by the Experiment Station and the Extension Division. These two services, which in reality constitute one, are a joint National and State endeavor to bring to agriculture and home economics the blessings of modern science and the arts. The Experiment Station aims particularly to discover new facts and to assemble and adopt established information for use on Utah farms. The Experiment Station is very ably officered and is doing work that compares favorably with the best done in America. The building up of a permanent and prosperous agriculture is at once the most difficult and important task, of a material character, that confronts our people. Many generations will be needed to solve all the problems. That we are progressing as rapidly as can well be expected is a source of gratification.

The Extension Division

The Extension work of the College is securing measurable returns in dollars to the State that exceeds many fold the investment in this enterprise. The County Agents

and Home Demonstrators represent a service to the Utah farm and home and with similar agents in other states, a service to the nation which is probably the most remunerative undertaking of government and state. This Extension service is developed in direct response to the needs of the farmers and housekeepers as expressed through their organizations. They are available to explain to the Legislature, as needed, their desires in regard to the development of this work. As a state enriches its civilization it is wise to base that enrichment upon enlightened farm life. A prosperous and intelligent and contented rural population is the first need of any nation.

The State Power Plant

The State Power Plant, which is under the direction of the Board of Trustees of the College, furnishes power and light for the College, and the following other State institutions: The State Capitol, the State University, the State Prison, the School for the Deaf and Blind, the State Industrial School, and the State Armory. Power from the State Plant located in Logan Canyon is transmitted at one and one-half cents per kilowat hour to Ogden and Salt Lake City over the lines of the Utah Power and Light Company. It is estimated that this plant saves to the State of Utah \$75,000 per year, this representing the difference between the cost of production of power here and its transmission on the one hand, and the commercial rates, on the other hand, of such power if purchased in Logan, Ogden, and Salt Lake City. The plant is run very efficiently and is a most valuable State asset.

The Branch of the College

The Branch of the Agricultural College located at Cedar City is in better condition in all ways now than ever before in its history. For a number of years this institution has received inadequate maintenance appropriations. The request for the coming biennium is held as low as is consistent with respectable work. The opening up of the great iron deposits near Cedar City and the building of a railroad into the city will undoubtedly greatly aid the institution there in its work. The record of the Branch College is entirely commendable; the support of the people of Southern Utah is very cordial and generous; and it is hoped that State finances will permit the adequate development of the work in Cedar City.

Growth, Enrollment, Expenditures and Costs

The College during recent years has grown very rapidly. This development has manifested itself in increase in student enrollment, which, despite the depression felt in agriculture most severely, has continually gone up. Details of registration and costs are given later in this report.

It should be noted that the College receives a substantial portion of its income from the Federal Government. During the year 1921-22, as an example, the total State maintenance appropriation was \$186,000 (for the teaching of students.) During the same year our total State and Federal appropriation (counting also fees and income under certain Federal contracts and other earnings) was \$308,000. That is of every dollar we spend, only 60 cents is from State Legislative appropriation, the other 40 cents is from Federal and other sources. There has been likewise due to fortunate Federal aid in part, a development of our laboratory and class room facilities which puts the College in much better condition physically than ever before. It has been found necessary because of increase in students, to establish Deanships for the six larger divisions of our work and to create the office of Dean of Women, effective July 1, 1922, for the first time. That these organizations will materially aid the College in its work is beyond question.

One of the more important changes of the past year was in the creation of the Office of Dean of the Faculty. The office has long been needed to aid in the standardization of teaching, in effecting economies between departments and in exercising general supervision of the conduct of the students. Dr. Frank L. West, the first to occupy this position, deserves such an honor by virtue of the contributions he has made to the development of the College in past years. He was chairman of the committees which conducted the surveys and analyses which preceded the organization of our courses of study in the group elective system, the establishment of the College on the Quarter basis of instruction, and several other fundamental improvements in organization and policy, which other institutions it is interesting to note, adapted to their own use after our successful establishment of the same.

The Spiritual and the Moral

I would consider this College unfruitful if it failed to give to the thousands who come to it from year to year more than a merely intellectual conception of life and its problems. The purely intellectual has failed pitifully in solving the social and political evils of today and always will fail to exalt mankind to a higher social being, and our insistence upon the purely intellectual or academic will force us to travel the road that all people have traveled to ruin. The tragedy of decaying Europe is in no small part related to a failure in education. Our educational institutions must be impregnated with the Christian ideal of service. This religious motive, which is not of any sectarian significance at all, if it can be made part of the lives of our students will once and for all lay the foundation for the solution of their own problems and the many harassing problems of general conduct. There is a close relationship between practical education and this ideal of service. Too many institutions unconsciously train their students, by indifferent and impractical courses into indolence and selfishness. Many students obviously seek to escape life's burden through education. This attitude, alarmingly prevalent in the educational world today, represents an aggregate social loss that is stupendous. If only those could be admitted to the advantages of higher education who passionately seek work and responsibility, the problem of costs in institutions would be solved. Any state can afford to train any number of its young for productive citizenship because such work is wealth-producing not wealth-consuming. But no state can afford, no matter how "intelligent" such students may be, to train either a listless or a destructively selfish population, grossly indifferent to their social obligations, who hope by their education to live from the toil of others. It is this spiritual test which should determine a young person's fitness for higher education.

One of the greater dangers of education in America today is not that we are admitting too many to our colleges who are mentally inferior. The natural tests, if the colleges are conducted upon a high plane of regard for learning, should automatically eliminate these indigent. The real danger is in giving knowledge to the spiritually weak who receive it gluttonously conceiving of learning in terms of animal selfishness.

Loyalty to Ideals

I cannot refrain mentioning at this time the laudable spirit which characterizes the faculty as well as the students. There is a total absence in the faculty of any influences except those related to the work of the College. There is a commendable democracy of life and effort on the part of the faculty. I believe our community represents a real comradeship in learning that reflects itself in many desirable ways. I hope that no polluting influence may disturb this very commendable accomplishment.

I take pleasure in expressing for the faculty, students, and alumni, the great esteem in which they hold the governing Board of the College. The Board of Trustees has not only unselfishly performed the many arduous duties of administering the affairs of the Institution but its President and the members have imparted to the whole Institution a very fine feeling of stability and integrity. Each an asset, while intangible, is worth more to the College than millions of endowment without it.

Very respectfully submitted,

ELMER G. PETERSON,

President of the College.

EXPENDITURES, ENROLLMENT, AND TEACHING COSTS AT THE UTAH AGRICULTURAL COLLEGE FOR THE PAST TWELVE YEARS

Year	Total Expenditures for Teaching Students		Total Enrollment of Students (not Counting Short Courses or Special Extension classes)	No. of Students Equated to Basis of Full School Year Attendance†	Total Cost per Student Based Upon Full School Year Attendance	Price Index; i. e., Cost of Labor and Commodities (from Babson's Reports)	Cost per Student (Equated to Price Index)	Details of Enrollment		
	Utah Legislature Appropriation	Utah Leg. App'n plus National App'n & Fees						Fall, Winter and Spring Quarters	Summer Quarter	Special
1911-12	\$ 67,000	\$144,000	868	575	\$250	99.4	\$252	658	150	60
1912-13	62,000	151,000	1225	820	184	100	184	944	224	57
1913-14	66,000	147,000	1233	776	189	100.6	187	806	268	159
1914-15	77,000	155,000	1403	781	198	102.5	193	795	207	401
1915-16	78,000	161,000	1383	758	212	113.4	187	760	208	415
1916-17	83,000	178,000	1659	797	224	136.1	164.5	790	256	613
1917-18	108,000	196,000	1530	804	244	160.8	151.5	837	196	497
1918-19*	147,000	203,000	1260*	609*	334*	176.8	189*	589*	232*	439*
1919-20	191,000	286,000	2031	1129	253	243	104.1	1225	241	565
1920-21	160,000	297,000	2163	1155	256	169	152	1174	347	642
1921-22	186,000	308,000	2447	1245	247**149	158	156	1197	474	776
1922-23	.....	.....	....	....	..	....	....	....	...	...

*This was war year. In addition to the 1260 (Total students) as listed above, the College trained 1394 students who were members of the Student Army Training Corps.

**This is total cost counting State and National expenditures. For the year 1921-22, counting only the Utah appropriation, the cost per student was \$149, and for 1922-23 only \$129, with corresponding lower costs in all the other preceding years.

†If a student is in attendance six months he is considered in this column only $\frac{2}{3}$ of a student; if in attendance three months only $\frac{1}{3}$ of a student; if six weeks only $\frac{1}{6}$ of a student. This computation therefore gives a most accurate statement of enrollment.

°These figures represent for the past two years the total enrollment counting all extension classes conducted regularly but not counting short courses of brief duration.

SUMMARY OF FINANCIAL NEEDS FOR THE BIENNIUM BEGINNING APRIL 1, 1923

THE UTAH AGRICULTURAL COLLEGE

Salaries and Wages	\$166,000.00
Maintenance (Supplies)	63,000.00
Repairs	19,000.00
Equipment	12,000.00
	<hr/>
Total.....	\$260,000.00

THE UTAH EXPERIMENT STATION

Salaries and Wages	\$ 92,000.00
Office Expenses	6,500.00
Travel	3,000.00
Maintenance (Supplies)	9,500.00
Repairs	4,000.00
Equipment	5,000.00
Permanent Improvements	31,000.00
	<hr/>
Total.....	\$151,000.00

THE EXTENSION DIVISION

Salaries and Wages	\$105,900.00
Office Expenses	10,500.00
Travel	28,690.00
Maintenance (Supplies)	1,000.00
Repairs	400.00
Equipment	1,300.00
Fairs and Exhibits	2,000.00
Institutes, Short Courses, etc.....	6,000.00
Contingent	2,000.00
	<hr/>
Total.....	\$157,790.00

SUMMARY OF FINANCIAL NEEDS FOR THE
BIENNIUM BEGINNING APRIL 1, 1923

(Continued)

THE BRANCH OF THE AGRICULTURAL COLLEGE

Salaries and Wages	\$ 29,000.00
Office Expenses	2,700.00
Travel	1,800.00
Supplies	14,580.00
Repairs	6,120.00
Equipment	8,800.00
Permanent Improvements	2,000.00
Total	<hr/> \$ 65,000.00

THE STATE POWER PLANT

Salaries and Wages	\$ 12,636.68
Office Expenses	211.08
Travel	100.00
Maintenance (Supplies)	33,434.36
Repairs	1,300.00
Equipment	6,344.00
Total.....	<hr/> \$ 54,026.12

DIVISION OF INTERIOR INSTRUCTION

To the President of the College:

Sir: I have the honor to report herewith the Division of Interior Instruction for the past biennium.

Faculty

The quality of instruction in the Institution is of a high order because of the scholarship and the natural ability as teachers of the faculty. Out of 86 resident instructors, there are 15 who have the Doctor's Degree, 23 have the Master's Degree, and 40 have the Bachelor's Degree. These men and women have done graduate work in 25 different large Universities of this country. The average age of the faculty is about 34 years—the average age of the Deans and Directors is but 38 years. It is apparent that these men and women are in the very prime of life, strong and vigorous. The scholarship and progressive character of the faculty is further proved by the large number of bulletins and scientific papers representing the results of their research that are being published regularly in the scientific journals, the numerous assemblies of the teachers in Science Clubs and Seminars for the discussion of the most advanced and recent thought in the various fields of science and in the line of methods of improving their teaching.

Cost of Instruction

A detailed and accurate study of the cost of instruction per student in this and similar western Agricultural Colleges has been made by this office, the result of which shows that the cost in this Institution is considerably lower than that in the others, thus indicating an efficient administration of the public funds placed at our disposal.

By means of accurate records of the size of the classes and the number of credits taught by each faculty member, we have been able to properly equalize the teaching load among the faculty members and also to adjust the size of the classes for maximum efficiency in teaching.

Type of Student

The great majority of our students are hard working, serious minded young people who attack their work with earnestness and enthusiasm. To stimulate them in this direction, numerous prizes and honors are awarded each year to those who excel in their work. During 1920-21 the scholastic standing of the students was: "A" students 13 per cent, "B" students 45 per cent, "C" students 23 per cent, "D" students 8 per cent, and "F" students 6 per cent.

Discipline of Students

The serious student who conducts himself or herself as a lady or a gentleman would not know that there are any rules or regulations in the Institution. About the only general rule is the "Golden Rule." We need not go back far into the history of higher education to find a period when students' actions were prescribed in great detail with scores of rules and regulations and numerous financial penalties prescribed for infraction of the same. We have departed from this system in the handling of our students. It is, however, made perfectly clear to them that if they do not successfully complete at least 75 per cent of their courses, that they will be suspended from the Institution and their parents notified; the final suspension, however, being preceded by warning to the student and parent several weeks in advance of suspension. Obviously if a student either through mental incapacity or laziness does not do the work assigned him, he should not be allowed to waste his parent's money and the state's money by continuing in the Institution. We find it necessary to suspend a very few indeed, because of failure to do their work, or for any other cause. This, of course, is not a reform school and once in a long while when we find a student whose habits and actions are such as to destroy the good name of the Institution and contaminate the clean, wholesome young people that are here, that student is asked to withdraw.

Spirit of Institution

The spirit of the Institution is very democratic. A large number of the young people find it necessary to work their way through school. These are among our

best students and they are treated with the same consideration and courtesy that is shown the children of parents more comfortably fixed. Very little "snobbishness," therefore, exists here.

The Institution recognizes the fact that to educate a man or woman of vicious habits, or criminal tendencies increases his or her power to prey upon or do violence to society—further that the development of a fine character and a reverential attitude toward sacred things, and a respect for law and order are even more important than regular class room instruction. With this in mind, weekly devotion exercises have been established, at which sermons are delivered by the best speakers to be found in our state. This assembly is attended regularly by more than ninety per-cent of the faculty and students of the school.

Respectfully submitted,

FRANK L. WEST,

Dean of the Faculty.

SCHOOL OF AGRICULTURE

To the President of the College:

Sir: I have the honor to report herewith the School of Agriculture for the past biennium.

The School of Agriculture has completed a very successful two years despite the tremendous slump which farm products have taken. The enrollment has been up to normal and the numbers of our graduating class in Agriculture have steadily increased since the war. There have been a great many changes in the personnel of the faculty of the School of Agriculture during the past two years but I am happy to report that with all these changes we have the strongest Agricultural faculty, we believe, that we have ever had. The Department of Farm Practice has been organized during the biennium, and while entirely new, has made a very creditable and satisfactory growth. The needs of the School of Agriculture for the next biennium may be summarized as follows:

Help

Each department in the School of Agriculture is carrying a heavy teaching load and each is asking for more teaching assistance. It is felt that relief can be given by the Institution in its present state of finances by giving to these departments more clerical help or student assistants. This would relieve men of doing an immense amount of clerical and routine work, and would thereby increase their efficiency from 50 to 100 per cent for the real work of the Institution.

Better Library Facilities

The library facilities need to be greatly improved. We are maintaining ourselves in library work as it relates to Agriculture, to say nothing of buying the new things that every Agriculture library ought to have. We are tremendously short in the agricultural journals. There ought to be not one copy of Government and Experiment Station publications, but several copies bound up and available for reference work. We have practically none

of a wealth of foreign agricultural literature and we do not secure more than one of the vital books in agriculture published in this country to four that are produced. Seminar courses are almost impossible. Regular courses are inadequately taught on account of this great shortage.

Finish Plant Industry Building

The work of the Botany and Agronomy Departments is hampered very much because rooms occupied by these departments are only half finished. The roughing-in has been done for sinks, for hot water, for distilled water, for gas and for electricity, throughout, but half of these connections have not been completed. It is necessary to carry the tremendous quantities of distilled water, used by these departments, in bottles from the Chemistry Building. There is no hot water though the outlets have been provided for the same. Rooms in the basement designed for the cold storage plant lack only the connection with the plant in the Livestock Building, and the necessary insulation to make adequate cold storage rooms. Lecture and laboratory tables and office equipment are also needed.

Acquire the Practice Farms

There is a trite expression, "we learn to do by doing," which applies with special force to the teaching of agriculture. The splendid results which have been achieved by our Farm Practice Department during the first year of its existence are bringing expressions from students, and from farmers all over the State who visit our school, that by all means that part of our agricultural teaching program ought to be made permanent. The Agricultural College ought to own these practice farms. Students should be able to get the necessary practical experience in any line of agriculture, on them. Graduates going out are handicapped in their ability to get the most desirable positions on account of their lack of practical experience.

More Farm Animals

Utah is essentially a livestock state. There ought to be at the Agricultural College more animals of all of the different breeds than we have at the present time.

We ought to have a representative herd of sheep. The \$12,000,000 brought into Utah each year from the sheep industry certainly calls for a greater consideration of the needs of that industry at the Utah Agricultural College.

Man in Sheep Husbandry

Need has been felt for a long while for a man in Sheep Husbandry, who knows sheep, who knows wool, who knows the technique of caring for the flock at all times, and who knows how to teach.

Veterinary Laboratory

A veterinary laboratory is needed very badly at the Agricultural College. When the Plant Industry Building was built, the Veterinary Hospital was moved and was given to another department with the idea that another veterinary hospital would be established in connection with the barns. A course in agriculture is not complete without this most essential factor for teaching students how to care for sick and injured animals.

More Laboratory Equipment for Teaching Poultry

While through the Experiment Station, we have a fine commercial flock of hens, the laboratory facilities for teaching poultry are very inadequate. There is not the opportunity for students to study the various kinds of fowls kept on the farm and there is not the opportunity for students to get actual practice in handling these fowls without buildings especially adapted to that work. Our appropriation in that regard ought to be for all kinds of farm poultry with housing facilities for each, obtained and designed from the standpoint of the use of that equipment for teaching purposes.

Variety Orchard

Horticulture is an extensive agricultural industry in Utah. All of the leading commercial and culinary varieties of apples, pears, peaches, cherries, plums, apricots, small fruits, etc. should be available to our horticultural students throughout the growing season as well as at ripening time. It is recommended that since Practice Farm No. 2

already has commercial fruit orchards and a great many other facilities for teaching practical work in horticulture, that that farm be acquired at once and that steps be taken to make the varietal plantings which are essential for good horticultural teaching.

Greenhouse Facilities

These are needed by students in Botany, Agronomy, Horticulture, and Entomology. Access to growing plants under normal conditions is needed in all these departments, and Entomology needs very much an insectory for its teaching and experimental purposes.

Trees and Shrubs on the Campus

The Agricultural College should maintain a complete collection of trees and shrubs and flowers on the campus that will do well under Utah conditions. Beauty as well as convenience is a prerequisite to contented life on the farm. Not only should students come into contact with and know the desirable species, but farmers and their wives ought to come to the Agricultural College campus and find here the trees and shrubs and flowers which they could reasonably expect to be successful on their farm homesteads.

Respectfully submitted,

GEORGE R. HILL, Jr.

Dean, School of Agriculture.

SCHOOLS OF AGRICULTURAL ENGINEERING AND MECHANIC ARTS

To the President of the College:

Sir: I have the honor to report herewith the Schools of Agricultural Engineering and Mechanic Arts for the past biennium.

During the biennium just past additional interest has come to the Departments of Irrigation and Roads. The finishing of the first unit of our Irrigation demonstration laboratory and the frequent irrigation field trips, together with the very efficient instruction given, has been the means of making this department very popular.

The same might be said of the Department of Roads. The nation-wide interest in good roads, and the government co-operation in this construction, has made the construction of roads the greatest single engineering field. The need, therefore, of well-trained men in this line is apparent. The Veterans' Bureau have sent us some fifty men to be trained in this line, many of whom have been approved for four year courses.

In the School of Mechanic Arts many advances have been made. Our work has been arranged so that we are not as crowded in the Winter Quarter as heretofore. College courses previously given in that Quarter, are given during the Spring and Fall Quarters, thus leaving the shops with better facilities for handling the Winter Quarter men and obviating the crowding that we have previously had. Our shop courses have also been very much better outlined and standardized. Our shop instructors have also co-operated with the State Department of Education in taking several teachers' training courses, which have proved very beneficial.

The finishing of the Irrigation Laboratory has deprived the auto department of the room that was previously used for elementary Auto Mechanics. It is now very necessary that we get the concrete platform at the rear of the auto shop covered over, which at an expense of \$1500.00 will add an auto repair room 70 ft. by 40 ft.

We are also very much in need of an electric furnace for the heat treatment of steel, and a hollow chisel mortiser for the wood shop.

Electric Furnace	\$1000.00
Hollow Chisel Mortiser	900.00

This latter machine is a replacement, as our old mortiser is entirely worn out.

I will say, in conclusion, that both Schools are in good condition, both as regards equipment and teaching force.

Respectfully submitted,

RAY B. WEST,

Dean of the Schools of Agricultural
Engineering and Mechanic Arts.

SCHOOL OF COMMERCE AND BUSINESS ADMINISTRATION

To the President of the College:

Sir: I have the honor to report herewith the School of Commerce and Business Administration for the past biennium.

Attendance

Considering the fact that this is primarily an agricultural institution, the registration in this School is surprisingly large. Approximately one-sixth of the entire student body register in the School of Commerce and Business Administration. This is attributable in part to the emphasis that is being placed on the business aspects of agriculture. Last year the graduating class was the largest and best trained group of men and women that have gone from the School. All of them are occupying good positions or are furthering their educational work.

Equipment

The greatest need which this School feels, aside from a few maps and charts for class use, is a suitable place where business reports, business reference books and technical journals could be filed and kept in such a way that they would be readily available for use in classes or in preparing material for publication. This work could be done in connection with our courses in office management so that practically no expense would be incurred except a small amount for filing cases and publications. Space can be provided in one of our rooms so that the material would be under constant supervision. It is hoped that if any rearrangements are made, the offices and class rooms of this School may be brought closer together.

Courses of Study

The work of this School is divided into the following Departments: Accounting and Office Management, Business Administration, Economics, History, Marketing, Political Science, Sociology, Stenography and Typewriting and part

of the courses in the Department of Agricultural Economics. In all of these departments an effort is being made to offer those courses that will best meet the needs of those who are preparing for life in the inter-mountain section. Special attention is given to the fundamental principles of social science.

With the addition of a new head of the Department of History, it will now be possible to expand the work in the Department of Political Science.

The one department in which we are most in need of expansion is that of Sociology. Because of limited help we are failing to realize the opportunity which is offered in this field. A well trained man to take over and expand the work in this department should be employed just as soon as that is possible.

Faculty

This School suffered an almost irreparable loss in the death of its Director, Professor George B. Hendricks. His excellent training, years of experience and kindly sympathetic nature fitted him admirably for the work he was doing. He is still missed by all who knew him.

A few other changes have been made in the teaching staff. Mr. J. D. Howell, Instructor in Stenography, resigned at the close of the last school year to engage in other work. This place has not yet been filled. Professor F. D. Daines has been granted sabbatic leave for the present school year. The work he did last year is now being done by Professor Joel Ricks, who has just been added to the teaching staff. When Professor Daines returns he will become Professor of Political Science and the work in this field and history will be considerably expanded. Miss Cecilia Kays, Instructor in Stenography and Business English, also resigned at the close of the school year 1920-21. Professor D. E. Robinson was promoted to the rank of Professor of Marketing and is now head of that Department.

Needs

As already indicated, the greatest need of this School is for additional help in teaching. Besides a man to become the head of a greatly enlarged Department of

Sociology, there should be at least one good instructor to assist in the Departments of Economics and Business Administration where the classes are already so large as to make high grade work impossible. Such a man might also help in the work formerly done by Mr. Howell. In the opinion of the writer, money spent for this purpose brings the highest possible return. High grade class work will bring us continued support of both the public and our student body more than anything else we can do.

All of our Departments are in need of more adequate and up-to-date library facilities.

Respectfully submitted,

W. L. WANLASS,

Dean, School of Commerce and Business
Administration.

SCHOOL OF GENERAL SCIENCE

To the President of the College:

Sir: I have the honor to report herewith the School of General Science for the past biennium.

The enrollment is increasing at a very gratifying rate.

During 1920-21 there were 170 students enrolled in the School of General Science. In 1921-22 this enrollment was increased to 252. The registration for the present year up to the time of making this report indicates a very healthy increase over last year.

It should be remembered that in addition to handling the above registration, the School of General Science is called upon to furnish the basic sciences and cultural subjects for all of the other schools of the College. This throws a very heavy burden upon such departments as English, Education, Mathematics, Chemistry, etc., and they will need additional teaching force during the coming biennium.

These departments have separate reports attached and will make known their various needs.

Respectfully submitted,

A. H. SAXER,

Dean, School of General Science.

SCHOOL OF HOME ECONOMICS

To the President of the College:

Sir: I have the honor to report herewith the School of Home Economics for the past biennium.

The State Supervisor of Home Economics advises us that the Home Economics teachers from the U. A. C. class of 1922, are doing more satisfactory work than any preceding group in their first year of teaching; that, in fact the 1922 graduates exhibit such skill and mastery in teaching as place them now in the class of those who have had one year of experience. This points out to us that our teacher training work as now given is a feature of very great strength in our Home Economics work.

If the suggestion is followed that readjustments be made in the staff, such that there is brought in a woman highly trained in Home Economics, and fully able to direct research work in all the phases of Home Economics, it will make answer to the demand for advanced courses as noted in your letter of June 26, 1922, and also add prestige to the School since the quality of such work will be in keeping with the American Home Economics Association's recommendations for conduct of graduate work. Inasmuch as the entire time of such a staff member would not at first be required for direction of research work, she could assist in established college courses and also render great service in the development of certain college courses for which we feel a definite need, e.g., Chemistry of Textiles and Laundry.

The apparent improvement in the organization of the Household Administration Department and in the character of the courses in that department contributes strength to the entire School.

Respectfully submitted,

JESSIE WHITACRE,

Dean, School of Home Economics.

SUMMER QUARTER

To the President of the College:

Sir: I have the honor to submit herewith the report of the Summer Quarter sessions for the past biennium.

The total attendance for the Summer Quarter for 1921 was 476, that of 1922 was 582, These students came from the following localities:

Utah by Counties	1921	1922
Beaver	4	1
Box Elder	8	22
Cache	218	272
Carbon	2	1
Davis	3	9
Duchesne	6	4
Emery		4
Garfield	5	6
Grand		1
Iron	4	4
Juab	5	3
Kane	3	1
Morgan	3	2
Millard	6	14
Rich	3	4
Sevier	3	4
Sanpete	12	12
Salt Lake	28	24
Summit	5	6
San Juan	3	1
Tooele	4	
Utah	18	26
Uintah	7	8
Wayne	4	8
Washington	7	5
Weber	22	13
Wasatch	2	7
Other States	1921	1922
Arizona	3	3
Arkansas	1	
Alabama		2
California	1	4

Other States (Cont.)	1921	1922
Colorado	19	25
Georgia		1
Idaho	30	38
Iowa	3	2
Indiana	1	1
Illinois	1	4
Kansas	1	1
Maryland	1	1
Massachusetts	1	
Minnesota	4	
Missouri	1	1
Mississippi		2
Michigan		1
Montana	2	2
New York	1	1
New Mexico	1	4
New Hampshire		1
Nevada		1
North Dakota		1
Ohio		4
Oklahoma		1
Pennsylvania	1	1
Texas	3	1
Vermont	1	1
Wisconsin		1
Wyoming	11	11
Washington	1	
Foreign Countries		
Canada	1	1
Mexico	1	
China	1	1
Greece		1
Turkey		1

Instruction was given in the following departments:
The numbers refer to the number registering in each department.

	1921	1922
Auto Mechanics, including		
Repair and Ignition ..	38	49
Accounting	14	58
Agronomy	35	31

	1921	1922
Animal Husbandry	26	25
Art	69	95
Bacteriology	9	3
Agricultural Economics ..		30
Bees	7	26
Chemistry	57	43
Concrete Construction and Testing	32	19
Dairy Husbandry		9
Education and Pedagogy.	327	426
Economics, General	25	35
English	231	276
Farm Practice		17
Foods and Dietetics	9	19
Forging	8	34
History	69	91
Household Management ..	17	
Home Health and Nursing.		21
Horticulture	15	
Irrigation		21
Library Economy	3	3
Machine Work	16	28
Mechanical Drawing	34	32
Marketing	12	44
Mathematics	61	106
Modern Languages		6
Music	40	77
Nature Study:		
(Human Geography) ...		48
(Animal Biology)		35
Office Management		8
Physical Education	70	97
Physiology	38	43
Political Science	49	
Poultry	33	37
Public Speaking		50
Shop Mathematics	17	
Sociology	16	22
Stenography	12	16
Tractors		24
Textiles and Clothing	38	29
Typewriting	26	50
Veterinary Science.....	38	12
Woodwork	44	66
Zoology		15

The Summer Quarter has become a very important part of the instructional branch of the College, both in the number and grade of its students and in the quality of the instruction offered; each year emphasizes the necessity of making it as strong or stronger than any other quarter of the school year.

The reasons for this are apparent when we consider that the summer is the only time available to teachers to attend college and secure the necessary credits to raise the grade of their certification or for the renewal of certificates already held.

The scholarship requirements for high school teachers are constantly becoming more exacting so that those who are ambitious to retain leadership in their profession must do post graduate work. This biennium has been marked by the considerable number of teachers who have entered our Summer Quarter for this purpose.

When the Utah Agricultural College Summer School was organized, and for many years thereafter, only a six weeks program was conducted and the College authorities hesitated before offering a full quarter schedule. The experiment proved successful beyond their expectation; this year 375 students were registered for work during the last term and many more would have remained had the curriculum included a larger choice of subjects.

The lecture program of the 1922 session was excellent, better than that of any previous Summer Quarter: Dr. Lewis M. Terman, Head of the Department of Education of Leland Stanford Jr., University; Dr. James G. Needham Head of the Department of Entomology of Cornell University; and Dr. Charles J. Bullock, Head of the Department of Economics of Harvard University were the lecturers. The value of such a course of lectures is hard to measure. The great majority of the State teachers and others are unable to attend any of our big Universities where they come into personal contact with the leaders of educational thought. A well planned lecture course will in a large measure make up for this loss.

It is recommended that there shall be a very decided enlargement of the scope of the curriculum especially in post graduate work and also such an adjustment of the general teaching schedule as will permit more heads of departments to conduct classes.

It is further recommended that the College shall each year invite a few of the really big men from the leading universities and colleges of our nation to lecture before the student body; and that in case heads of departments considered essential in our Summer Quarter are assigned to other duties well trained men from other colleges will be employed to conduct regular classes.

Respectfully submitted,

JAS. H. LINFORD,

Director, Summer Quarter.

EXPERIMENT STATION

To the President of the College:

Sir: I have the honor to submit herewith a report of the Utah Agricultural Experiment Station for the past biennium:

The work of the Experiment Station is in a most healthy condition with perfect harmony and accord among the workers. Not only is every man in charge of a project attempting to do all he can for the solution of the problem involved, but there exists the very best spirit of co-operation and every member has a personal and experimental interest and concern in every project.

On account of lack of funds it was necessary to make a material reduction in the personnel of the staff, and on July 1, 1922, the salary budget was reduced approximately \$11,000. However, the organization has been maintained in the Departments and every effort is being made to keep up the standard of work which has long been established in the Experiment Station.

Changes in Personnel

Dr. F. S. Harris, Director of the Experiment Station since July 1, 1915, resigned his position to take effect September 1, 1921, to become President of the Brigham Young University. Prof. William Peterson, Geologist of the Station, was chosen to fill the vacancy. In February 1921, the Utah Experiment Station experienced a great loss in the death of Prof. George B. Hendricks who was in charge of marketing work for the Station. Dr. W. L. Wanlass, a graduate of John Hopkins University, was placed in charge of this work.

The following additional members of the Station Staff resigned during the biennium: Dr. M. C. Merrill, Horticulturist; Miss Blanche Cooper, Angus M. Maughan, Scott Ewing, N. E. Edlefsen, Yeppa Lund, H. E. Flanders, Frank N. Harmon, George E. King, Arthur Fife, and Kiefer B. Sauls.

The appointments made to the Staff during this period were: I. M. Hawley, Ph. D., Cornell University, in charge of the Department of Entomology; and Professor George

B. Caine and Gustav Wilster, of the Dairy Department, for research and experimental work in dairying. Mr. David A. Burgoyne was appointed to fill the vacancy of Secretary to the Director. Prof. Tracy H. Abell, Assistant Horticulturist, and Prof. R. J. Becraft, in charge of Range Management, were each granted a leave of absence for the years 1921 and 1922, respectively.

Committees and Meetings

A slight change in administration was effected which allows more detailed consideration of projects under way. Committees have been appointed from the Station Staff to deal especially with projects having to do with definite departments. Each committee passes on the plan of the project, considering the progress made in the project, and when the problem is sufficiently developed to allow for publication the committee carefully reviews the outline of material to be published and gives careful scrutiny and criticism to the final manuscript before it goes to the printer.

In addition, weekly meetings of the staff are held during the winter months and each Station Staff member who is carrying a project makes a detailed report to the other workers of the present status and progress of the project under consideration. Both in committee work and staff meetings the members of the Extension Division are invited and cooperate in detail in the consideration of problems now included or proposed as projects for experiment station work.

These committees are as follows:

1. Field Crops
2. Dry Farming
3. Soils and Soil Moisture
4. Livestock
5. Irrigation, Drainage and Ground Water
6. Meteorology
7. Feeds and Feeding, Range Management
8. Rodents, Insect Pests
9. Fruits
10. Plant Diseases
11. Honey
12. Fertilizers

13. Nutrition
14. Farm Management
15. Marketing
16. Plant Breeding
17. Weeds
18. Poultry

Projects

The projects which are active with the Staff of the Experiment Station workers are listed as follows:

1. Nephi Dry-farm Substation
2. Other Dry-farm Stations
3. Irrigation Practice at Greenville
4. Vegetation House
5. Moisture, Soil, and Crop Relations
8. Potato Breeding
9. Rotation and Fertility Tests
10. Miscellaneous Field Studies
11. Action of Alkali
12. Soil Moisture Studies
15. Pumping for Irrigation
16. Amount of Irrigation Water to Apply
17. Soil Moisture Constants
18. Irrigation Institutions
19. Dairy Rations
20. Hog Rations
21. Steer Feeding
22. Factors Influencing Bacterial Activities of Soil
23. Permanent Fertility Studies
24. Survey of Composition of Irrigation Waters
25. Ground Water Development
31. Potato Diseases
33. Canning Crop Diseases
34. Plant Disease Survey
36. Poultry Breeding
37. Incubation Studies
38. Canning Crops
39. Utilization of Horticultural Products
40. Horticultural Survey
41. Breeding of Horticultural Plants
42. Grain Varieties
43. Grasshoppers
47. Lighting Poultry Houses
48. Range Survey

49. Soil Survey
50. Honey Bees
51. Miscellaneous Insects
52. Nutrition of Infants
54. Farm Organization
55. Types of Farming
56. Miscellaneous Farm Management Studies
57. Poultry Feeding
58. Ashley Valley Studies
59. Davis County Experimental Farm
60. Sugar Beet Diseases
61. Reseeding Ranges
62. Cereal Breeding
63. Marketing Utah Fruits
64. Cultural Methods
65. Weed Control

Publications

The publications of the Experiment Station for the last biennium include both the regular bulletins and circulars as well as publications in scientific papers. The lists for these two divisions follow:

Bulletins and Circulars

Bulletins:		Author or Authors	No. in		Total No.	
No.	Title		Edition	Pages	Pages	Pages
175	Sixteen Years of Dry Farm Experiments in Utah.....	F. S. Harris, A. F. Bracken and I. J. Jensen	12,000	43	516,000	
176	Potato Improvement by Hill Selection..	George Stewart	12,000	28	336,000	
177	Some Types of Irrigation Farming in Utah	E. B. Brossard	9,000	140	1,260,000	
179	Apple Candy: A Commercial Use for Cull Apples	T. H. Abell	5,000	14	70,000	
180	The Irrigation of Alfalfa.....	F. S. Harris and D. W. Pittman	11,000	30	330,000	
Circulars:						
43	Feeding Work Horses.....	W. E. Carroll	12,000	18	216,000	
44	The Agriculture of Utah.....	F. S. Harris	14,000	32	448,000	
45	Alfalfa Production under Irrigation..	George Stewart	13,000	48	624,000	
46	Thirty Years of Agricultural Experiments in Utah	F. S. Harris and N. I. Butt	12,000	64	768,000	
Total Number Pages.....					4,568,000	

Publications in Scientific Papers

1. Ewing, Scott—"The Movement of Saturated Water Vapor through Quartz Flour." *Soil Science*, Vol. 13, No. 1, (May, 1921).
2. Gardner, Willard—"The Capillary Transmission Constant and Methods of Determining it Experimentally." *Soil Science*, Vol. 10, No. 2, (Aug., 1920).
3. ——"The Capillary Potential and Its Relation to Soil Moisture Constants." *Soil Science*, Vol 10, No. 5, (Nov., 1920).
4. ——"Note on the Dynamics of Capillary Flow." *Physical Review*, n. s., Vol 18, No. 3, (Sept., 1921).
5. ——"Theory of Capillary Flow." *Trans. Utah Academy of Sciences*, Vol. 2, pp. 101-103, (1921).
6. Gardner, Willard and Widtsoe, J. A.—"The Movement of Soil Moisture." *Soil Science*, Vol. 11, No. 3, (March, 1921).
7. Greaves, J. E.—"The Antagonistic Action of Calcium and Iron Salts towards Other Salts as Measured by Ammonification and Nitrification" *Soil Science*, Vol. 10, No. 2, (Aug., 1920).
8. ——"Influence of Salts on Bacterial Activities of the Soil." *Botanical Gazette*, Vol. 33, No. 3, (March, 1922).
9. ——"The Influence of Irrigation on the Composition of the Soil." *Jour. Am. Soc. Agron.*, Vol. 14, No. 5 (May, 1922).
10. Greaves, J. E. and Carter, E. G.—"Influence of Moisture on the Bacterial Activities of the Soil." *Soil Science*, Vol. 10, No. 5, (Nov., 1920).
11. Influence of Moisture and Soluble Salts on the Bacterial Activities of the Soil." *Soil Science*, Vol. 13, No. 4 (April, 1922).
12. Greaves, J. E., Carter, E. G., and Lund, Yeppa—"Influence of Salts on Azofication in Soil." *Soil Science*, Vol. 13, No. 6 (June, 1922).
13. Greaves, J. E. and Hirst, C. T.—"The Soil Solution." *Jour. Indus. & Engin. Chem.*, Vol. 14, No. 3 (March, 1922).

14. Greaves, J. E. and Lund, Yeppa—"The Role of Osmotic Pressure in the Toxicity of Soluble Salts." *Soil Science*, Vol. 13, No. 2 (Aug., 1921).
15. Harris, F. S.—"Methods Used in the Study of Soil Alkali." *Science*, n. s., Vol. 52, No. 1339 (Aug., 1920).
16. Hirst, C. T. and Greaves, J. E.—"Factors Influencing the Determination of Sulfates in Soil." *Soil Science*, Vol. 13, No. 4 (April, 1922).
17. Pittman, D. W.—"The Relation of the Method of Analyzing Alkali Soils to the Limits of Toxicity." *Trans. Utah Academy of Science*, Vol. 2, pp. 95-99 (1921).
18. Richards, B. L.—"Pathogenicity of *Corticium Vagum* on the Potato as Affected by Soil Temperature." *Jour. Agr. Rsch.*, Vol. 21, No. 7 (July, 1921).
19. —"A Dryrot Canker of Sugar Beets." *Jour. Agr. Rsch.*, Vol. 22, No. 1 (Oct., 1921).
20. Stewart, George—"Can the Farms of the United States Pay for Themselves?" *Jour. Farm Economics*, Vol. 2, No. 4 (Oct., 1920).
21. —"Size of Initial Payment Required to Permit Purchase of a Farm in a Given Time." *Jour. Farm Economics*, Vol. 3, No. 3 (July, 1921).
22. —"Varietal Nomenclature of Oats and Wheat." *Jour. Am. Soc. Agron.*, Vol. 13, No. 8 (1921).
23. Stewart, Robert and Hirst, C. T.—"Comparative Value of Irrigated and Dry Farm Wheat for Flour Production." *Jour. Indus. & Engin. Chem.*, Vol. 4, No. 4 (April, 1921).
24. Thomas, M. D.—"Aqueous Vapor Pressure of Soils." *Soil Science*, Vol. 11, No. 6 (June, 1921).
25. West, F. L.—"Long-time Temperature Prediction." *Science n.s.*, Vol. 52, No. 1356 (Dec., 1920).
26. —"A Simple Equation of General Application for the Normal Temperature in Terms in Time of Day and the day of the year." *U. S. D. A. Mo. Weath. Rev.*, Vol. 48, No. 7 (July, 1920).

27. —“The Approximate Normal Temperature as a Function of the Latitude, Elevation, Time of Day, and Day of the Year.” U. S. D. A. Mo. Weath. Rev., Vol. 49, No. 4 (April, 1921).

Farms

1. GREENVILLE FARM. During the biennium ten acres of land was purchased as an addition to the Greenville Farm. This land has been fenced, leveled, and is now in preparation for pasture experiments. As reported by Professor Pittman, Superintendent of the Farm, there are some badly needed improvements which will have to be supplied in the near future. The old wooden flumes which have been used for a long period in the distribution of irrigation water have so deteriorated that the annual up-keep is much more than interest on money necessary to replace these flumes with better equipment.

The place is without water and it is absolutely necessary that a well be installed near the residence and that a suitable manure pit be constructed. Otherwise the farm may be continued with about the usual expense. As is also listed by Professor Pittman, there is a certain amount of new machinery which must be purchased to take the place of all that is past doing service.

2. DAVIS COUNTY EXPERIMENTAL FARM. The Davis County Experimental Farm consists of 20 acres of rented land. This land is rented at present by the County Commissioners of Davis County and is turned over to the Utah Agricultural Experiment Station for investigation. In addition to the rent Davis County also furnishes \$1000 annually to help defray the expenses of investigation. In association with the farm the owner has allowed the use of a poor residence which is now serving for a home for the superintendent.

The Davis County Commissioners are anxious that this farm be purchased through appropriations from the Legislature and become the permanent property of the Utah Agricultural Experiment Station. This is very desirable, though if it should be accomplished it will necessitate the erection of machine sheds, fruit houses, and other permanent equipment on the farm. It has been thought unwise to erect anything permanent until the ownership of the farm was definitely decided.

The detail of the work carried on, on the farm is given in the report of the Davis County Experimental Farm by Mr. A. L. Wilson, present superintendent of the farm.

3. NEPHI DRY-FARM SUB-STATION. For many years the work at the Nephi Sub-station has been carried on co-operatively with the U. S. Department of Agriculture, but due to lack of funds the Department withdrew its support in 1920. Therefore, during the biennium the entire cost of the experimentation has been borne by the State.

The work has progressed satisfactorily, and from year to year rather striking developments in arid farming are being produced. Mr. Bracken has been superintendent of the farm during the past biennium, and under his able supervision the investigation has gone forward and at the same time a very pleasant co-operative spirit with communities adjacent to the farm has been established.

4. WIDTSOE DRY FARM. The farm at Widtsoe was developed from raw land and for the first two years work was accomplished with difficulty. At present, however, the farm is in first-class shape and good results can be looked for. This farm is especially interesting in that its elevation is 7,800 feet. Mr. D. W. Woodard is acting as superintendent of the farm.

5. KANAB FARM—The growing of grain on this farm has not been satisfactory. However, the growing of sorghum and some varieties of corn and Sudan grass have great promise. Only a portion of the farm at Kanab is being used for investigational work at present, the balance being turned over to Mr. I. C. Chamberlain, superintendent of the farm, to be used as designated by the authorities of the Utah Agricultural Experiment Station.

6. PANGUITCH FARM—The herd of pure bred Short-horn cattle on this farm has been going along splendidly. It was necessary to make more pasture and therefore do additional fencing so that the cattle might be properly taken care of on the farm. At present the herd consists of the following:

Herd Bull	1
Cows	13
Heifers	8
Young Bulls	4
Spring Calves	12
Grade Calves	3 (breeding uncertain)
<hr/>	
Total	41

During the summer of 1922 the herd was culled carefully and all inferior animals disposed of. The farm from now on should be approximately self-supporting, unless something arises with reference to an unusually hard winter or something unforeseen happens.

7. CEDAR CITY FARM—The eighty acre tract of land west of Cedar City has been conducted primarily under the supervision of those in charge of the Branch Agricultural College. However, in addition to this tract ten acres of land was leased near the College buildings on which forage is being grown for the livestock of the College farm. This in turn has released ten acres close to the farm which has been platted and is at present under investigation for the collection of experimental data under irrigation.

Proposed Experimental Work

1. HIGH ALTITUDE FARMING—Reconnaissance survey and careful estimate show that in the State of Utah there are at least 500,000 acres of tillable land between 6,000 and 8,000 feet in elevation. These high areas generally are covered with deep rich soil and have a rainfall of from 12 to 30 inches annually. The growing season on these highlands is long enough to give promise of maturing many of the grains and forage plants grown on the colder lands in the northern regions. The conditions warrant a project of plant adaptation to subsidize the livestock industry.

2. ALFALFA-SEED PRODUCTION—Utah alone sold more than 5,000,000 pounds of alfalfa seed in 1921. Only 12,000,000 pounds were produced in the United States. Still there is much controversy among farmers as to how to grow seed. Seed experimental plats should be established in Millard County and in the Uintah Basin where tests of variety and best methods of cultivation and irrigation could be determined.

3. RANGE PROBLEMS—Further observations should be made as to the carrying capacity and the time of grazing of our natural forage plants. Experiments should be conducted to determine the best time at which stock may be put on the range.

4. PASTURE SURVEY—Land has been purchased for the purpose of experimenting with the most promising pasture grasses. The land is being prepared and is under observation preparatory to definite experiments.

5. FERTILITY TESTS—A six-acre tract of land has been purchased for the purpose of conducting fertilizer tests. This land is now being studied as to uniformity of composition and productivity. Both artificial and natural fertilizers will be studied as to, (1) influence on the immediate productivity of the soil, (2) influence on the lasting productivity of the soil, and (3) influence of the various fertilizers upon the chemical, physical, and biological properties of the soil as well as their effect upon the chemical composition of the crop.

Department and Farm Reports

Reports of the farm as well as detailed reports of the several projects carried on by the various departments of the Station are attached herewith. Part of the report from each department is an estimate of the needs of the next biennium. The assemblage of these requests shows the Station to actually be in need of payroll help, supplies, equipment, and new apparatus amounting to the aggregate sum of \$131,775. This in addition to salaries, printing, office help, travel, etc. This would bring the requests from the Station for all expenses to be paid from State appropriation up to \$244,730. This amount is actually needed to furnish equipment, supplies, and help which would make the several departments most productive.

Needs for the Biennium

Due to the stringency of money and the State's condition with reference to taxes it is thought unwise to ask for the total at this time, and the sum requested by the departments, \$131,775, has been worked over so that an estimate of that which would probably allow for the work to continue in a smaller way and place a hope on a future date when the very much needed supplies may be furnished in full. The following request is made by the Experiment Station for the next biennium:

Total Amount from State, U. S.	
Government, etc.	\$217,255
Amount to be received from U. S.	
Government	\$60,000
Estimated Sales refund	6,000
	<hr/>
Total amount to be received ..	
(exclusive of State)	66,000
	<hr/>
Balance required from State	\$151,255

Detailed Account of Budget Necessary

Salaries	\$113,955	
Departmental Budgets	58,100	
Office Supplies, Printing, Travel, etc.	12,000	\$184,055

Additions Necessary

1. Well at Greenville Farm	400	
2. Extension of Seedhouse to hold Thresher and Test Mill	600	
3. Construction of Greenhouse	1,200	\$ 2,200

New Projects to be Taken Up

1. Alfalfa-seed Investigation	\$ 8,000	
2. Range Management Studies.....	9,000	
3. High-elevation Experiments	8,000	
4. Soil Survey (Field Work)	6,000	\$ 31,000

\$ 217,255

Amount Received from U. S.

Government	\$ 60,000
Estimated Sales Refund	6,000

Total Income (exclusive of State)\$ 66,000

Balance, or what is absolutely necessary
from State for next biennium\$ 151,255

Respectfully submitted,

WILLIAM PETERSON,

Director.

FIELD CROPS

To the Director of the Experiment Station :

Sir: I have the honor to submit herewith the report of the work done in the Department of Field Crops for the past biennium together with the estimate of needs for the coming biennium.

Projects

PROJECT NO. 2 (OTHER DRY-FARM STATIONS). Two small dry farms are maintained beside the Nephi Sub-station. One is at Widtsoe and one at Kanab. At Widtsoe where the elevation is 7800 feet winter wheat has been found to succeed. Turkey has been the best variety so far given a fair trial. Of the spring varieties Early Baart and Pacific Bluestem are best. At Kanab corn and sweet sorghum for forage have both done well.

PROJECT NO. 8 (POTATO BREEDING). It has been shown that hill selection may increase the acre-yield of potatoes from 60 to 90 per cent. Selected stock grew more quickly, gave better stands, and produced higher yields that were of better quality. Improvement in quality came in two respects: (1) smoother and more uniform tubers and (2) fewer culls, whether of small tubers or rough and misshapen tubers of good size. In 1920 the selected strains yielded 353.4 bushels an acre as compared with 168.6 bushels for unselected stock. In 1921 the yield was 257.9 bushels an acre for the selected and 159.7 for the unselected. This is an average gain of more than 75 per cent. In the selected strains 91.3 per cent were marketable tubers as compared to 80 per cent for the unselected.

PROJECT NO. 10 (SILAGE CORN, FLAX, AND ALFALFA)—

A. *Silage Corn.* At the Davis County Farm a test has been made of seven varieties of silage corn. Improved Leaming is the common variety of the State, but it was felt that larger strains could be used by planting early in order to lengthen the growing season. Strains were collected locally and from the U. S. Department of Agriculture. The acre-yields were as follows:

Leaming	12.9 tons
Lancaster	14.8 tons
Million Dollar	14.5 tons
U. S. Selection No. 77.....	18.2 tons

U. S. Selection No. 119.....	17.2 tons
U. S. Selection No. 182.....	17.0 tons
U. S. Selection No. 193.....	11.0 tons

Many farms use even lower yielding strains than Leaming.

It is thought that the data are applicable at least to Boxelder, Weber, Davis, Salt Lake, and Utah Counties where most of the silage is grown.

B. *Flax*. Flax has been tried and found to yield from 18 to 28 bushels of seed an acre under irrigation.

C. *Alfalfa*. Alfalfa plants have been studied and some extremely promising individuals obtained. Owing to lack of funds and lack of help, however, this project will have to be temporarily abandoned.

PROJECT NO. 42 (GRAIN VARIETIES). The following wheat varieties have been under plat test during the last biennium: Dicklow, New Zealand, Little Club, Marquis, Early Baart, Pacific Bluestem, and Sevier. Of these, Sevier has been the highest yielder by about 7 bushels, but on account of its extremely weak straw it cannot at present be recommended for ordinary farming conditions. Dicklow has been the most profitable of the varieties on commercial farms. It outyielded all other varieties except Sevier by about 3 bushels an acre. New Zealand and Early Baart are next best, with Little Club, Marquis, and Pacific Bluestem proving entirely unsatisfactory on account of low yield. Marquis and Little Club both yielded 10 to 15 bushels an acre less than Dicklow. Pacific Bluestem is only slightly ahead of Marquis and Little Club.

About 20 other varieties were tested by the rod-row method in order to find out whether there were high yielders not hitherto recognized. Of these, two Australian wheats—Federation and Commonwealth—have shown considerable promise. Sevier wheat has also turned out to be a good yielder on the dry farm where its weak straw is not a handicap. Other varieties of good yielding power are Turkey, Kanred, Odessa, and Blackhull.

CERTIFIED SEED WHEAT. During the summer of 1922 fields of wheat were certified for seed. This involves field inspection before harvest and analysis of the threshed grain. This may be counted as a pure seed project. This seed has yielded in the past an average of 12 bushels an acre in excess of ordinary impure seed.

PROJECT No. 62 (CEREAL BREEDING). Breeding work on wheat has been of three principal phases: (1) plant selection of Sevier, (2) plant selection of Dicklow, and (3) hybridization of Dicklow-Sevier in an effort to unite the strong straw of Dicklow with the higher yield and hardness of Sevier.

Plants in all varieties vary greatly in their yielding power. In Dicklow three strains out of 38 that are under test have given yields about 20 per cent above the ordinary stock of the variety. In Sevier 188 strains were begun by plant selections. About 20 of these are yielding consistently higher than the bulk variety. Several are doing very well under irrigation and several others under dry-farm conditions. One strain is at present outyielding the unselected Sevier by about 35 per cent under dry-farm conditions.

Considerable promise has been found in the hybridization work. About 300 strains are now under observation. It seems likely that after two or three years more work a strain bearing the good qualities of Dicklow and Sevier may be isolated. This would be a high-yielding strain with stiff strong straw and hard grain.

Staff Personnel and Departmental Expansion

The greatest present need is a young man to work permanently in the department. Because most of the work is technical in nature it requires a well-trained man; student help requires nearly as much time for the supervision of exacting work as would be required to do the work. I have had, one at a time, three student assistants, each of whom became capable, rapid, and efficient. By that time, however, they were prepared to take full-time positions and left because we could offer them only \$30 to \$40 a month. What is needed is a young man's full time, costing from \$1600 to \$1800 a year, or \$3200 to \$3600 for the biennium.

Desirable New Work

There are three distinct lines of work that would spring at once in importance if we had trained help to handle them: (1) An alfalfa breeding project could be launched at once, using the plants that have been under study for the last four years. (2) Selection work and variety tests on oats and barley could at once expand to the proportions permitted by the help. Land is not now

available for this work. Renting is possible. (3) Grain grading for farmers would give them a check on what they were told by grain buyers. Herein might lie a very highly valuable field of and to producers. Indirectly it should stimulate better quality in crops.

Seed Certification and Inspection

Certification of seed crops and organizing seed growers' associations as a means for accomplishing certification needs to be developed through the Experiment Station. If this is not done, it will develop in other channels where it must be much less satisfactory. Untrained men cannot do this work at all.

Shall we test seed for farmers? This requires highly trained labor and considerable equipment. A seed laboratory would cost about \$1500 in equipment and about \$1800 a year for a man in addition to the one already mentioned. If a properly trained man were hired he would be free in July and August to help in field inspection of certified seed fields. He could also handle inspection of all threshed certified seed grain and alfalfa seed. He could also make milling and baking tests. The teaching of courses in seeds and grading could be handled by this man. In my opinion it is time to develop these extra-experimental phases of our work. To me it seems to be a matter merely of whether the Experiment Station shall do seed certification and seed inspection work or let some other organization—governmental or commercial—do it for them.

Pasture and Alfalfa Seed Experimentation

A pasture experiment is badly needed. It should be studied from two angles: (1) kind and management of plants and (2) kind and management of animals. A 10-acre field is now owned, but it needs drainage and subdivision. Drainage would cost about \$300 and subdivision and seeding about \$200. Presumably the Animal Husbandry Department could furnish animals.

There is also great need of an experiment, or experiments, to study alfalfa-seed production both as to variety and method. It may also be that plant selection would open an unexpectedly promising field. The work would require land, water, and summer help of at least moderate training—about \$125 a month for a man.

Miscellaneous

Dry farming at high altitudes, that is, above 7,500 feet, might greatly increase the area of farming land in Utah. Small experimental farms would have to develop methods and find or breed the varieties suited to these new sets of conditions.

Equipment Needs

Minor but pressing needs of the department are as follows:

1. A rod-row thresher and power costing about \$300.
2. A grain drill costing about \$125.
3. A grain binder costing about \$150.
4. Seed storage boxes that are metal lined, or otherwise mouseproof, costing about \$200.
5. Books, monographs, and professional papers not found in College or Station Libraries—\$200.
6. Cases in which to mount and keep plant-breeding specimens for future progress comparisons, cost about \$100.

Budget Needs

A budget allowance for miscellaneous equipment, supplies, trips, and extra labor will be needed to keep the department in operation, even in the present retarded stage of development. Several projects have been operated at minimum capacity during the past two years and several not at all.

A normal resuscitation of essential work will require a considerable increase in the departmental budget. During the year July 1, 1921, to June 30, 1922, there was an expense of \$1,600 in budget expenses. This was without any seed certification; without any seed inspection save for the most haphazard coming-in of samples; without any work on barley, oats, or alfalfa either for hay or seed; without any pasture experimentation; and without any winter wheat at Logan except in the nursery. It is estimated that a budget to cover this work should be in the neighborhood of \$2,500 a year. Any sort of expansion to experimental high-altitude farming, alfalfa-seed production and seed certification would increase this to \$3,000 yearly, or \$6,000 for the biennium.

Summary of Financial Needs

1. Urgent Needs—

1. A trained assistant, at \$1800 a year.....	\$3600
2. Pasture drainage, subdivision, and seeding..	500
3. Rod-row thresher and power.....	300
4. Grain binder	150
5. Seed storage boxes	200
6. Specimen cases for plant breeding.....	100
7. Budget for labor and miscellaneous equipment, trips, supplies, etc., at \$3000 a year..	6000

2. Expansion Needs—

1. Seed certification help and seed laboratory inspector	\$3600
2. Seed inspection and milling-baking test machinery	1500
3. Alfalfa-seed experimentation	2000-6000
4. High altitude dry farm	2000-6000
5. Grain drill	125
6. Books and monographs	200

Popularizing Experimental Work

A neglected phase of experimental work and one that seems to be of great promise is the getting of results to the press. Provision should be made for this in the future.

Respectfully submitted,

GEORGE STEWART,

Agronomist

In Charge, Department of Field Crops.

GREENVILLE FARM

To the Director of the Experiment Station:

Sir: I have the honor to submit herewith a report on the Greenville Farm.

Previous to this biennium, the Greenville Farm consisted of only 11 acres of land with no buildings and was administered as a part of the Agronomy Department. With the land purchases of two years ago the place is now increased to 45 acres of land admirably adapted to experimental work, with a house and a few outbuildings. The place is now managed with a separate budget.

In addition to a great deal of work that will be reported by other departments, the following has been accomplished on the farm during this last biennium:

Projects

PROJECT NO. 3 (IRRIGATION PRACTICE)—This project has been continued according to the 1912 plans. It is a study of the effect of different amounts of irrigation water and different times of application on alfalfa, sugar-beets, potatoes, and small grains. In April, 1921, the results with alfalfa were published as Bulletin No. 180—"Irrigation of Alfalfa"—wherein it was shown that while larger and more frequent irrigations have a higher yield than less, still there was very little increased yield when more than 25 or 30 acre-inches of water were used. The results with barley are now in press as Bulletin No. 178—"Irrigation of Barley"—which shows that barley, like the other small grains, requires early irrigation here and not more than 15 acre-inches of water altogether.

The results with potatoes and sugar beets are nearly ready for the press and will soon be published. They show that frequent small irrigations are better for these crops than less frequent larger ones.

Since the plats on this project are begining to show the effect of continuous cropping the plans were changed this last year so that now all of the crops occupy the land in succession in a 10-year rotation. This should make it possible to continue the experiment indefinitely on the same plats and study as many phases of the irrigation problem as possible. At present the problem of the optimum amount of water is being studied more thoroughly.

This year's results although not yet completed have already shown decisively that insufficient irrigation strongly favors the development of dry rot (*Phoma boeta*) in sugar beets.

A new crop, canning peas, has been added to the experiment and this year's results indicate rather conclusively that for the early "Alaska" peas early irrigation is much better than later.

PROJECT NO. 4 (VEGETATION HOUSE)—This project was continued according to the 1915 plans until this last year, studying the effect of maintaining the soil at different moisture contents on the yield of alfalfa. The results were published in Bulletin No. 180—"Irrigation of Alfalfa"—and showed a maximum yield of alfalfa when the soil was maintained at about the optimum moisture content for plowing or seed germination. When the soil was wetter than this the yield was greatly decreased. This last year a similar experiment has been conducted with sugar beets.

PROJECT NO. 5 (MOISTURE, SOIL, AND CROP RELATIONS)—This project has been continued in accordance with the 1911 plans. It continues to show a maximum yield of corn with 20 to 30 acre-inches of irrigation and a very great increase in yield when manure is applied. This year some of the plats were sampled and the samples are being studied chemically and bacteriologically to determine the residual effects of the treatments of the soil.

PROJECT NO. 9 (ROTATION AND FERTILITY TESTS)—This project has continued as before and in addition has been much increased by the inclusion of many plats whose fertility has been exhausted by continuous cropping without manure. The experiment now includes 6 different rotations and numerous comparison plats continuously cropped. Both in the rotation and comparison plats varying quantities of manure, green manure, and no manure are being compared. Observations to date show that rotations which do not include a sod-forming crop or manure will not maintain the fertility of our soils, that continuous cropping, with grain, is more exhaustive to the fertility of the soil than continuous cropping with beets, although the beets are more sensitive and show the results sooner, that very light applications of manure will quickly restore the fertility of our soil, and that applications as heavy as 40 tons to the acre are still beneficial.

PROJECT No. 64 (CULTURAL METHODS)—This project is rather new and is at present confined to a study of the proper distance of thinning sugar beets and the methods of applying irrigation water. The results so far indicate that leaving one beet to each foot of row gives a higher yield than any other distance, and that irrigating in every furrow throughout the year is better than irrigating in alternate furrows throughout the year but that giving one or two small irrigations in alternate furrows very early in the season and then irrigating in every furrow throughout the year is better still.

PROJECT No. 65 (WEED CONTROL)—This project has shown that dense stands of wild morning glory may be eradicated in one year by frequent clean cultivation, by choking with sunflowers, or by frequent spraying with sodium arsenite, the thoroughness being in the order mentioned. All other methods tried were unsatisfactory. It is hoped to extend this experiment to other weeds and other soil types.

Visitors

In addition to occasional visitors, whose aggregate number during the year is considerable, the farm was visited each year during the Annual Farmers' Encampment by large numbers of farmers, and the whole work of the place was carefully explained to them.

Needs

Experimental work of this nature costs money and the amount of very valuable work that can be accomplished is limited largely by the funds available. Considering the large number of people who may profit by these experiments, however, the expense involved is really very small. To carry on the routine work of the experiments as now planned for the next two years will require for payroll about \$6400.00 and for miscellaneous supplies about \$1600.00, or a total of about \$8000.00.

Since the size of the farm has been much increased and but little permanent equipment added in the last biennium there is needed considerable permanent equipment on the place which would enable more and better work to be done at less expense.

A well to supply drinking water for the men and horses is needed since the culinary stream from the canal

is not to be depended upon, especially during the busy seasons of the spring and fall. At present drinking water must be hauled and the horses frequently led a considerable distance to water. A deep well would be required as there is no water close to the surface. It could probably be put in and equipped for \$400.00.

A corral is needed in which to turn the horses at night and over Sunday. This would cost about \$100.00. A wagon scale is needed on which to weigh the crops from the plats which must now be weighed in small quantities on small platform scales. A wagon scale would cost about \$150.00. A manure pit is needed in which to store the manure to be used on the farm. At present it must be piled in the open to suffer a loss of probably 75 per cent of its fertilizing value. A good pit could be built for about \$150.00.

The wooden flume system for conveying water to the plats in measured quantities has been in service for 20 years and is in bad shape, requiring a large expense for repairs each year and making the work inaccurate by reason of the leakage. It should be replaced with a permanent underground system costing about \$3000.00

A steel granary is needed in which to store grain, seed, etc., which at present is badly eaten by the mice. This would cost about \$100.00. A new machine shed is needed since the old one is inadequate protection for our equipment. It would cost about \$200.00.

A filing cabinet is needed for the office where many of the records must now lie on open shelves inadequately protected against loss. It would cost about \$50.00.

The vegetation house equipment should be moved from the Campus (where it has become an eyesore) and placed in a cement pit on the farm, thus making the soil temperature conditions more normal. This would cost about \$100.00. The 10-acre west field of the farm needs to be drained before any very exacting experiments are started there. This would cost about \$200.00.

If carefully controlled fertility experiments are to be started on the south 6 acres of the farm, a system of conveying measured irrigation water to the plats is needed, preferably a permanent underground pipe system. This would cost about \$2500.00.

Due to the necessary economy of the past several years very little new machinery has been bought on the

farm and the old is getting in very bad condition. During the next two years there should be added to our equipment the following:

Grain binder	\$175.00
Manure spreader	150.00
Grain Drill	100.00
Beet puller	25.00
Mower	75.00
Harrow	20.00

An attempt has been made to state very briefly the work that has been done on the Greenville Farm during the last biennium and the most urgent needs for the future. Experiments on farms must be continued for several years to get thoroughly reliable results since seasonal conditions may make a few year's results inapplicable to average conditions.

Respectfully submitted,

D. W. PITTMAN,

Assistant Agronomist.

SOIL MOISTURE DETERMINATIONS

To the Director of the Experiment Station:

Sir: I have the honor to submit herewith the report of the progress on the two projects which have been under my direction since the departure of Dr. F. S. Harris, September, 1921.

Projects

PROJECT NO. 11 (ACTION OF ALKALI). This project was extensively developed during 1920 and 1921. Part of this investigation aimed at finding an ameliorating action on sodium carbonate in the soil, as indicated by the growth of wheat when other salts and soil amendments were added. It was found that the addition of nearly all the common soluble salts increased the toxicity of the carbonate but that manure, gypsum, and small amounts of nitrates produced some improvement. The work was submitted for publication in *The Journal of Agricultural Research* under the title: "The Toxicity and Antagonism of Various Alkali Salts in the Soil," by F. S. Harris, M. D. Thomas, and D. W. Pittman. However, due to certain delays in the Government Printing Office, this publication has not yet appeared.

The influence of alkali on both the moisture equivalent and wilting coefficient of soils was found to be small. The results, however, throw light on the cause of alkali injury of plants and also on the soil structure and will be used in connection with studies of these problems.

The vapor-pressure investigation reported under Project No. 12 has shown that this new method gives a reliable measure of the concentration of the soil solution in contact with the soil mass which is of fundamental importance in alkali toxicity studies. The method is also bringing out some interesting relationships between alkali and soil structure.

PROJECT NO. 12. (SOIL MOISTURE STUDIES). The principal work under this project has been a study of the vapor-pressure-moisture relations of soils. An introductory paper ("Aqueous Vapor Pressure of Soils" by M. D. Thomas, *Soil Science*, Vol. 11, p. 409-434, 1921) describes the experimental method and gives a theoretical discussion of some possible applications of the data. The results indicate that the vapor-pressure-moisture curves are approximately rectangular hyperbolae over a wide range, the

position of any individual depending essentially on the texture of the soil. The work has been extended to a study of comparatively dry soil and the second vapor-pressure paper is now ready to be submitted for publication. It has been shown that the structure is influenced markedly by different drying processes and the vapor-pressure-moisture function is therefore multivalued. Care must thus be exercised—comparing different soils to be sure the samples are really comparable. An interpretation of these results and the statement of a theory of soil structure has been made possible by the development, in co-operation with the Soil Survey and Physics Departments, of a new method of mechanical analysis (to be published in *Soil Science* by D. S. Jennings, M. D. Thomas, and Willard Gardner). This method permits the study of the soil colloids and should have great utility in research and survey work. On account of its simplicity its use will result in a great saving of time and labor as compared with the existing methods which are inadequate as well.

The Agronomy Department has also co-operated with the Soil Survey Department in working out a method of determining organic carbon in arid soils. An analytical method of this kind is needed and the data obtained from its use will have a bearing on the soil moisture and alkali relations. A joint paper is being prepared on this subject.

Future Work

As a result of the above investigations it is practically certain that a simple method of evaluating the structure of a soil—applicable to routine laboratory work—can readily be developed. Such a method should be valuable in survey work for expressing the degree flocculation of soil, as well as in fertilized experiments and in connection with the puddled condition of alkali land. It is planned to work out this method and also to continue the investigation of the influence of alkali on the soil structure and the concentration and composition of the soil solution.

Needs

The budget requirements for the biennium are as follows:

Payroll	\$1600
Laboratory equipment and supplies.....	1100
Total.....	<hr/> \$2700

The laboratory equipment and supplies includes \$300 for obtaining an air compressor to operate the Pasteur-Chamberlain fillers, a much needed piece of permanent equipment.

Respectfully submitted,

M. D. THOMAS,

Associate Agronomist.

NEPHI DRY-FARM

To the Director of the Experiment Station :

Sir: I have the honor to submit herewith the report on progress of experimental work conducted at the Nephi Sub-station for the past biennium with the needs for the next biennium.

1. Nephi Dry-farm Sub-station—

- A. Cereal Breeding.
- B. Plowing and Cultural Tests.
- C. Cropping Experiments.
- D. Fertility Tests.
- E. Rotations.
- F. Varietal Tests.
- G. Forage Crops Tests.
- H. Miscellaneous Tests.

- (1) Rate and date of seeding winter wheat.
- (2) Cultivation of wheat during growth.
- (3) Irrigated seed vs. Dry-land seed.
- (4) Smut Control Test.
- (5) Experiment on winter and spring wheats seeded under dry-land and irrigated conditions (Dr. J. A. Harris).
- (6) Seeding of winter wheat with furrow type drill as compared to seeding with the ordinary drill.

A. CEREAL BREEDING. This project includes pure-line selection and hybridization. Most all of the Turkey wheat grown in Juab Valley is now of Selection 26 from the Station Nursery. This wheat not only yields more than the ordinary Turkey but has better quality and is more uniform. This selection is now also being grown in other sections of the State. In 1922 the Nursery was made up of over 1200 rod rows. The severe summer has beyond question marked out some promising types for propagation. In its hybridization work plants with even better quality than Turkey and the beardlessness of Kofod has been produced.

B. PLOWING AND CULTURAL TESTS. In this project, a very detailed test on early fall, medium fall, late fall,

early spring, medium spring, and late spring plowing has been added in 1922. The test is replicated several times so as to allow for disking, packing, and leveling on each time of plowing with each preceded and followed by harrowing before seeding. The regular plowing test which has been conducted for several years showed for 1922 decided advantages for early spring or fall plowing followed by just normal cultivation. The test further showed advantages for plowing deeper than five inches but not deeper than ten.

C. CROPPING EXPERIMENTS. In the cropping experiment the alternate system with either fall or early spring plowing followed by normal cultivation of the fallow proved to be safest when such seasons as 1922 come. Poor plowing in respect to time with very little care of the fallow brought almost failures.

D. FERTILITY TESTS. In the fertility test with barnyard manure and green manure on crops such as peas and wheat plowed under at various stages of growth interesting results have appeared. Manure applied in amounts up to ten tons per acre each alternate year has given higher yields of wheat than smaller amounts. Wheat when plowed under for green-manure has failed by a wide margin to give yields as high as peas in the corresponding stage of growth.

E. ROTATIONS. Twenty-seven rotations including the crops: winter wheat and barley, spring, oats, potatoes, peas, and corn are under test. Interesting relationships are appearing. Corn, peas, and potatoes after fallow are yielding much less than where these crops follow wheat with continuous cropping. Wheat after wheat followed by one of the intertilled crops is a more profitable rotation than where barley or oats serve as the second cereal crop. Corn does better the first year after alfalfa than wheat. Alfalfa on the dry-land should be allowed to remain on the same land longer than four or five years for best returns.

F. VARIETAL TESTS. This project includes experiments with winter and spring wheat, winter and spring barley, emmer, spelt, oats, corn, and potatoes. Kanred and the Station Turkey selection No. 26, Sevier, and Clark's Black Hull are outstanding winter wheats. Of the spring wheats Chul and Early Baart lead. Thoroughbred of the potatoes with an average yield of 71 bushels over a period of seven years stands first. Eighteen winter wheats, twenty spring

wheats, eight oat varieties, six barley varieties, and nineteen potato varieties are under test.

G. FORAGE CROPS TESTS. Of the ten forage crops used in this test alfalfa and rye have been found to be the highest yielders.

H. MISCELLANEOUS TESTS.—

(1) *Rate and Date of Seeding.* The rate and date of seeding Turkey wheat, extending from 2 to 8 pecks sown on August 1, and every fifteen days thereafter until November 1, shows a decided advantage for seeding not less than five pecks per acre not later than October 1.

(2) *Cultivation of Wheat during Growth.* This test was sown for the first time this season; next year will give the first results. The plan of seeding was two plats seeded in the ordinary way with a spacing of rows 7 inches apart. One plat will be cultivated when wheat is growing, the other left uncultivated. In the second series of plats the rows are spaced 14 inches apart. The one plat will be cultivated between rows, while the other will be left uncultivated. In the third series the same method of treatment will be given; the rows will be spaced 21 inches apart.

(3) *Irrigated Seed vs. Dry-land Seed.* Better quality, darker color, and heavier weight is claimed by many farmers for irrigated seed sown on dry-lands. A test to find out the truth of this is now seeded in the soil at the Nephi Station. Two plats of irrigated seed are checked against two plats of dry-land seed.

(4) *Smut Control Test.* Many wheat types within varieties are immune from smut. In 1922 each wheat type in the nursery was inoculated with smut to determine which are smut-free. The results will appear in 1923.

(5) *Experiment on Winter and Spring Wheats.* Dr. J. A. Harris of the Carnegie Research Institution has found from his work at Nephi that cereal varieties differ in their sap characteristics. He hopes to demonstrate that a high-yielding, drouth-resistant cereal variety can be located easily and quickly by chemical and physical qualities of the plant juices. The test which has been sown for his work in 1923 is very extensive, being sown both on irrigated land and dry-land.

(6) *Seeding of Winter Wheat with Furrow Drill and Ordinary Drill.* In this arid region sometimes sufficient rain fails to come to germinate fall-sown cereals before winter. Even on the best of fallow the stored moisture is from 4 to 6 inches below the surface—too deep to place seed for safety. The difficulty seems to be a mechanical one. A new drill which has been used to advantage on the Great Plains was used at Nephi this year. With disks a foot apart, furrows to a depth of five inches are made, and the seed is sown two inches below the bottom of the furrow. In good fallow this would allow immediate germination. Checks with the ordinary drill are made to determine the value of this new drill. The first results will appear in 1923.

In way of help needed at the station at Nephi one trained man will be needed from April 1 to October 15 each year. In addition to this other help will be needed during weeding time in June and more help during threshing. Since the new tests have been added this past season at least \$2800 will be needed to cover expenses for the next biennium.

Respectfully submitted,

AARON F. BRACKEN,

Superintendent, Nephi Sub-station.

ANIMAL HUSBANDRY

To the Director of the Experiment Station:

Sir: I have the honor to report herewith the work of the Department of Animal Husbandry for the past biennium.

Projects

PROJECT NO. 19 (RATIONS FOR DAIRY COWS.) The work of this project has been to compare the value of dried beet pulp (after soaking) with pasture as a summer feed for milking cows. A test has also been made of the comparative value of soaked, dried beet pulp and corn silage in the winter ration of milking cows. Results of both of these tests are ready for tabulation and report.

PROJECT NO. 20 (HOG RATIONS). The work under way here during the last two years is the effect of prolonged maintenance of young pigs on their subsequent growth and development. Results for one year have been completed and reported.

PROJECT NO. 21 (STEER FEEDING). No work has been done on rations for fattening steers since 1920. That year closed two years' work on the quantity of grain to feed with alfalfa hay to fattening steers. Results are all tabulated and reports submitted.

WINTER AND SUMMER GAINS. There is under observation a herd of about 150 grade beef cattle run on strictly practical lines upon which record is being kept of weights and gains each spring and fall as they go to and come from the summer range. They are cared for in winter a little better than the average herd. This work is being done in co-operation with the Federal Practice Farm. One set of weights, spring and fall, has been taken.

SURVEY. A survey of present methods of beef production is being made. Considerable data have been collected. One questionnaire is still in progress.

Miscellaneous

WOOL STIMULANT. A miscellaneous test was run on a commercial product known as Ovagsolan which was claimed to stimulate the growth of wool. This has been completed and reported.

New Projects

HORSE FEEDING. A new project is being outlined to determine the most profitable amount of grain to feed with alfalfa hay to work horses.

BREEDING. A project is also being outlined on the effect of early and late breeding of heifers upon barrenness, regularity of breeding, and length of their breeding life.

Future Plans

One of the immediate needs of the department is a suitable plant at which experimntal work can be conducted on the proper winter management and feeding of the various classes of meat animals, including cattle, sheep, and hogs. The same equipment could be used in tests on breeding, growing, and fattening animals of the classes mentioned above. This should include sheds and yards for beef cattle, sheep, and hogs with a silo and suitable grain and hay storage. The yards should be of substantial construction, though the granary and sheds need not be expensive.

The livestock interests of the state are in need of assistance in these three lines of work and we are practically powerless to render the needed aid because of lack of equipment.

The total plant would cost approximately \$7,500, exclusive of the ground, though a unit of it could be constructed for much less and used until funds would permit its completion.

The work would be materially aided if a revolving fund of about \$10,000 a year could be made available with which to buy feeder cattle, lambs and hogs, and the necessary feed for their experimental rations. On the average this will be returned, and more, at the time of the sale of the animals.

It is felt that much more research could be accomplished if the animal husbandman were relieved of the College end of the work in animal husbandry. It is therefore recommended that the Station Animal husbandman be put on full-time Station work. This would necessitate the appointment of a new head of the College Animal Husbandry Department. If this change cannot be made it will be practically necessary to have a half-time assistant, and even with such help the work cannot go forward as with the other arrangement.

Summary of Needs of the Department

Livestock feeding plant*	\$ 8,000
Stenographic and office help	500
Labor at barns	600
Travel	400
Half-time assistant†	900
Revolving fund used for four months	10,000
Total	\$20,400

Range Management

It is hoped that early in this biennium it may be possible to adjust conditions so that a beginning can be made on the study of more effective utilization of the vast resources which make up the range areas of the state. From conferences already had with the Forest Service the best possible spirit of co-operation is manifest. It seems entirely feasible to get the necessary areas set aside and considerable expert assistance from them. At the present time another branch of the institution has over 100 head of beef cattle suitable for such experimental work that doubtless could be used for this purpose. In face of these conditions it seems extremely urgent that steps be taken at once to make full use of these agencies for range experimental studies. Apparently it can be done much more cheaply now than would be possible when cattle would have to be bought.

The cost involved would be almost exclusively for fencing. The size and number of the areas would of course determine the expense. In spite of slightly increased cost of the larger area it is felt that it would be a mistake to begin with areas so small as to have little practical significance. The reliability of the results where animals are involved is so much greater with more animals that areas too small to give results of at least average dependability should be avoided as a waste of money. The estimated cost of getting this work under way, if present conditions are taken advantage of, would be between \$4,000 and \$5,000.

Respectfully submitted,

W. E. CARROLL,
Animal Husbandman.

*\$2,000 to \$3,000 would construct a very usable unit.

†Not necessary if Animal Husbandman goes full-time with Station.

BACTERIOLOGY AND CHEMISTRY

To the Director of the Experiment Station:

Sir: I have the honor to report herewith the Department of Bacteriology and Chemistry for the past biennium.

Three projects have been carried on during this period. These are as follows:

1. PROJECT No. 22—Factors Influencing the Bacterial Activities of the Soil.
2. PROJECT No. 23—Permanent Fertility.
3. PROJECT No. 24—Composition of the Irrigation Waters of the Intermountain Region.

It has been found that many salts when applied to a soil in small quantities increase the bacterial activities of the soil. This is manifest by an increased production of ammonia, nitrates, and solubles as well as organic phosphorus together with an increased nitrogen fixation. Usually though not always, those salts which become toxic in the lowest concentration are the greatest bacterial stimulants.

“The nitrifying organisms of the soil are more sensitive to alkali salts than are the ammonifying or azofying. The last named group will tolerate large quantities of alkali salts. Probably the ill effect noted in soils containing small quantities of alkalies is due to their effects upon the nitrifying flora of the soil and only indirectly on the plants.”

(Greaves, J. E.—Influence of Salts on the Bacterial Activities of the Soil. *Botanical Gazette*, Vol. 63 (1922), pp. 161-180).

“There is a very close correlation between toxicity of the various salts and the osmotic pressure produced in the soil, thus showing that toxicity is due in part to osmotic disturbances.

“As an average, the various salts became toxic to ammonifiers when the osmotic pressure was slightly less than 3 atmospheres; with the nitrifiers between 1 and 2 atmospheres.”

(Greaves, J. E. and Lund, Yeppa.—The Role of Osmotic Pressure in the Toxicity of Soluble Salts. *Soil Science*, Vol 12 (1921), pp. 163-181).

"The optimum moisture content of the soil for maximum bacterial activity, stated in terms of the water capacity of the soil as determined by the Briggs modification of the Hillgard method, was found to be as follows:

Ammonification.....	60 per cent
Nitrification.....	50-60 per cent
Azofication.....	50-60 and 70-80 per cent

"These values were independent of the physical texture of the soil."

(Greaves, J. E. and Carter, E. G.—Influence of Moisture on the Bacterial Activities of the Soil. Soil Science, Vol 10 (1920), pp. 361-387).

"It did, however, vary slightly with the salt content of the soil."

(Greaves, J. E. and Carter, E. G.—The Influence of Moisture and Soluble Salts on the Bacterial Activities of the Soil. Soil Science, Vol. 13 (1922), pp. 251-270).

"The quantity of salt which can be applied to a soil without decreasing nitrogen fixation was found to vary with the salt but none were toxic at as low a concentration as for ammonifiers and nitrifiers."

(Greaves, J. E. and Carter, E. G., and Lund, Yeppa.—Influence of Salts on Azofication. Soil Science, Vol 13 (1922), pp. 481-499).

"We have found that since the chromate volumetric method is fairly rapid and easy of manipulation it may well be used for the determination of sulfates in soil solutions, but when a fair degree of accuracy is desired a factor must be used to correct for presence of aluminum, iron and nitrates."

(Hirst, C. T. and Greaves, J. E.—Factors Influencing the Determination of Sulfates in the Soil. Soil Science, Vol 13 (1922), pp. 231-249).

"A careful study has been made of the methods of obtaining a soil extract for the determination of chlorids, nitrates, and sulfates. Satisfactory solutions are obtained

with the Chamberlain-Pasteur filter or by the use of certain flocculants."

(Greaves, J. E. and Hirst C. T.—The Soil Solution. Journal of Industrial and Engineering Chemistry, Vol. 14 (1922), p. 224).

"Irrigation water has been found to modify the chemical, physical and biological properties of a soil to such an extent that it may leave it more fertile or a barren waste, depending upon the nature of the soil, kind and quantity of water used, and the conditions under which the water is used."

(Greaves, J. E.—The Influence of Irrigation Water on the Composition of the Soil. Jour. Amer. Soc. Agron., Vol. 14 (1922), pp. 207-212).

It is planned to continue the work under the three heads for the next biennium. This, however, should in most cases be extended to field work, which can be done only when more funds are available.

To continue the work now in progress the department must receive for payroll assistance \$1,500.00 and for chemicals and supplies \$2,000.00 *per year*.

During the past year Mr. Yeppa Lund has resigned and Mr. D. H. Nelson is now working part time.

Respectfully submitted,

J. E. GREAVES,

Chemist and Bacteriologist.

BOTANY

To the Director of the Experiment Station:

Sir: I have the honor to report herewith the Botany Department for the past biennium.

Projects

All research for the period has been conducted under the following projects:

PROJECT No. 31. (POTATO DISEASES). During the bien-nium this project has been divided into three sub-projects, as follows:

- A. Physiological Studies of Potato Growth and Seed Production.
- B. Rhizoctonia Studies.
- C. Mosaic Studies.

A. PHYSIOLOGICAL STUDIES OF POTATO GROWTH AND SEED PRODUCTION. Under this division physiological studies on growth and seed production have been made particularly in relation to climate and elevation. Conditions of seed storage and time of planting have also received consideration. Data have been secured along these various lines which will contribute definitely to a solution of our seed-potato problems and will offer a more definite physiological basis for seed production in Utah.

B. RHIZOCTONIA STUDIES. Two phases of this problem have received attention: (1) methods of seed treatment and (2) the accumulative effect of the fungus (Rhizoctonia) in the soil. The first phase of the work has shown the effectiveness of the mercuric-chloride treatment of potatoes and the ineffectiveness and dangers of a substitute, hot formaldehyde treatment, recommended by the Iowa Station. The second, or accumulative tests, is a 10-year project which already has yielded valuable results. Last spring, at the time of the third planting, 95 per cent of the young potatoes of the infested soil were attacked and seriously set back. All these plants on the infested plot died three and four weeks earlier than those on clean soil.

C. MOSAIC STUDIES. The following phases of the potato-mosaic problem are now being studied:

- (1) Field survey to determine distribution and economic importance.
- (2) Field and greenhouse studies to determine method and rate of transmission of the disease.
- (3) Field and greenhouse studies to determine varietal symptoms and rate of degeneration under western conditions.
- (4) Field project work in 7 different counties to investigate and demonstrate methods of mosaic control. (This phase consists of rigid roguing and selection work in the field.)

The mosaic project was started in the spring of 1922. Typical mosaic mottling has been found on three varieties of potatoes not previously reported in the United States. The disease is undoubtedly one of the most, if not the most, important single factor contributing to the chaotic condition of our western seed-potato industry.

PROJECT NO. 32 (PEACH DISEASES). Work on this project has been temporarily suspended.

PROJECT NO. 33 (CANNING CROP DISEASES). Work on this project has been necessarily limited to the root-rot and black-leaf of the pea.

Definite progress has been made on the root-rot during the past two years. At least four soil fungi are shown to be responsible for the trouble. The nature of these organisms and method of attack have been studied. The relation of these disease-producing organisms to possible systems of rotation is now under consideration.

Discovery, distribution, and relative importance of the black-leaf of the pea have been made and determined within the past two years. Present work consists of cultural and life-history studies of the causal organisms together with histological relations of the parasite to host.

Demands are being made to extend this project to include the following canning-crop diseases: Fusarium wilt and western blight of tomatoes, root and fruit rot of strawberries, and two important diseases of the raspberry. The diseases of the small fruits are becoming so serious as to demand an early and thoro survey.

PROJECT No. 34 (PLANT DISEASE SURVEY). The purpose of this project is to determine the presence, distribution, and economic importance of the various plant diseases, as well as to discover the relation of these diseases to cultural and irrigation practices. A further and vital purpose is served in showing the necessity and the nature of research work.

Present Status and Results. At present survey is being conducted on a number of the most important diseases such as seedling rot, dry-rot canker, leaf spot of the sugar beet, pea root-rot, barley strip, watermelon wilt, and the various parasitic diseases of the potato—Fusarium wilt, Rhizoctania, and scab. This work has clearly shown the serious importance and serious dangers of such a group of the more or less obscure crop diseases such as the mosaic of the potato, cytospora canker of poplars, dry rot or phoma rot of sugar beets, chlorosis of perennial plants, and a variety of diseases on the small fruits which are probably peculiar to our intermountain region. In addition, new and serious diseases have for the first time been detected. Three of these—a root rot of wheat found in Morgan County, a new and undescribed spot of the pea, and a root-rot of the strawberry—appear to be of a serious nature.

Plans. It is proposed during the next two years to intensify the survey on the various diseases now under observance in the project, and as a basis for further research to include those shown by previous survey to be of sufficient importance in the state, including the following: potato mosaic, chlorosis, cytospora canker of poplars, and the various new diseases of wheat, pea, strawberry, and raspberry.

PROJECT No. 60 (SUGAR BEET DISEASES). Three diseases of the sugar beet have received attention under this project—dry-rot canker, seedling sickness, and late blight or Phoma rot.

The work on the dry-rot canker during 1920 and 1921 resulted in a publication in *The Journal of Agricultural Research* (Vol. 22, No. 1, Oct. 1, 1921). Later studies have confirmed these earlier results and connected the disease up with a particular strain, No. 35, of the fungus.

There appears a similar but closely related disease of the beet probably due to another strain of this same species of fungus. This is now under observation.

The late blight or Phoma rot occurred in such epidemic proportions in 1921 as to demand immediate attention. Work has proceeded along the following lines:

- (1) Survey.
- (2) Isolation, identification, and cultural studies.
- (3) Local and climatic factors responsible for or serving as intensifying factors.
- (4) Cultural practices responsible for occurrence and eradication.

Results so far show that the trouble is closely correlated with drouth during late June and July, further than when this gap in the seedling development is carefully bridged by cultural and irrigation methods resulting in continual and uniform growth of the seedling there need be little fear of the disease.

The results of the investigations to date with specific suggestion for control have been published in *The Utah Farmer* (Vol. 17, Nos. 42, 43 (1922)).

It is proposed to continue these studies on beet diseases as outlined. A fourth disease of the sugar beet, cereospora leaf spot, will demand attention during the next two years. This disease is now doing damage in the Provo district and is spreading rapidly from that district as a center.

Departmental Needs

To properly carry on the work as outlined will require the following:

Help in way of payroll (assistants, etc.) . . .	\$2,400
Budget allowance for equipment and supplies (including travel)	3,000
Greenhouse and cold storage facilities (for much of the work that cannot be done in the field)	2,000
	<hr/>
	\$7,400

Pathological work is now at a standstill due to the lack of this equipment.

Respectfully submitted,

B. L. RICHARDS,
Associate Botanist.

* DAVIS COUNTY FARM

To the Director of the Experiment Station:

Sir: I have the honor to report herewith the work of the Davis County Experimental Farm for the past biennium.

The following outline indicates the scope of the projects carried on at the Davis County Experimental Farm:

A. Projects Outlined by Other Departments:

- (1) Department of Horticulture;
 - (a) Variety test of strawberries (See Project No. 41)
 - (b) Cost of production of strawberries
 - (c) Variety test and selection of tomatoes (Project No. 41)
 - (d) Variety test of ornamental shrubs and shade trees (Project No. 40)
 - (e) Methods of planting canning peas in relation to yield (Project No. 38)
- (2) Department of Agronomy;
 - (a) Variety test of silage corn (Project No. 10)
 - (b) Variety test of wheat (Project No. 42)
 - (c) Distance of thinning sugar beets in relation to yield
- (3) Department of Botany and Plant Pathology;
 - (a) Environmental factors affecting the seed quality of potatoes (Project No. 31 A)
 - (b) Effect of accumulation of Rhizoctonia in the soil (Project No. 31B)
 - (c) Studies on Mosaic of Irish potatoes (Project No. 31C)
- (4) Department of Entomology;
 - (a) Control of onion thrips (Project No. 51)
 - (b) Control of corn-ear worm (Project No. 51)

- (5) Department of Irrigation and Drainage;
 - (a) Irrigation practice for canning peas

B. Projects Directly Connected with Farm Project No. 59.

- (1) Onion Variety Tests
- (2) Comparative Test between Home-grown and Imported Seed Potatoes
- (3) Variety Tests of String Beans
- (4) Variety Tests of Canteloupes and Watermelons
- (5) Watermelon Breeding

Projects Directly Connected With Farm Project No. 59

(1) Onion Variety Tests—The third harvest has just been completed. In all, about 25 to 30 varieties will be continued in the future, thus eliminating 24 varieties as not apparently promising in this region. Riverside Sweet Spanish has proved to be superior to other varieties thus far. In connection with the variety test a storage test is being conducted. Unfortunately our facilities for this work are very inadequate and the best progress cannot be made.

(2) Comparative Test between Home-grown and Imported Potato Seed—This comparative test was under way during the years 1920 and 1921. However, this project was abandoned in favor of the more extensive project outlined and conducted by the Department of Botany and Plant Pathology in 1922.

(3) Variety Tests of String Beans—This project has been under way for two years. It is the plan to run every variety grown for string beans purposes for two years and then to eliminate the unpromising varieties and continue the likely varieties. The first elimination will take place at the close of the 1922 season. In all, 65 varieties have been grown.

(4) Variety Tests of Canteloupes and Watermelons—It is the purpose of this work to grow from year to year the new varieties of these melons, offered by seedsmen, in comparison with the three or four standard varieties.

(5) Watermelon Breeding—The aim of this project is to produce a wilt-resistant watermelon by breeding wilt-resistant members of the melon family and the edible, marketable varieties of melons. At the end of the 1922 season the results of the first crosses will be harvested.

Future Plans

A plan covering a number of years cannot be outlined at this time since the lease held at the present has only two years more to run. Variety work should be continued indefinitely. First, there should be a place where new varieties of staple truck crops could be tested out from time to time as they are offered, and second, when the extensive variety tests on crops as now in progress are completed there are other crops which should be brought under extensive varietal observation. However, it would seem that too large a per cent of our land is being utilized by variety tests and that when permanent plans are consummated more space and time should be devoted to selection and breeding studies and to cultural methods. With the increased amount of produce being shipped out of this state there is an increasing demand for packing and storage and shipping information. With adequate packing and storage facilities this farm would be in a position to work out valuable information.

Needs

With the addition of an extensive celery project and the changing from the general to more specific type work the budget will necessarily need to be larger than the past biennium. To do the work efficiently the following amount is necessary:

Payroll help	\$6,000.00
Equipment, supplies and travel.	1,500.00
	<hr/>
Total	\$7,500.00

Respectfully submitted,

A. L. WILSON,

In charge, Davis County Experimental Farm.

ENTOMOLOGY

To the Director of the Experiment Station:

Sir: I have the honor to report as follows on the projects of the Department of Entomology for the past biennium.

Most of the work of the department has been carried on under *Project 51* (Miscellaneous Insects), but some work has been accomplished on *Project 30* (Apple Leaf Roller) and *Project 50* (Honeybees). Observations have been made on the effectiveness of insecticide oils as dormant sprays for the eggs of the apple leaf roller. This work has shown that for Cache Valley conditions these sprays are not as effective as has previously been supposed. An experiment has also been conducted to find the best method of wintering bees. This work, as well as other work along this line, should be continued.

Under the project of Miscellaneous Insects (51) the sugar-beet root-maggot (*Tetanops aldrichi* Hendel) has received the greatest attention. The biology and life history of this pest has been entirely worked out and some factors that may influence the control have been discovered. This work will be continued.

Spraying experiments were conducted for the pear-leaf blister-mite in which about fifteen commercial oil and lime-sulfur sprays were applied at different stages in the development of the tree. In spite of a light infestation of the pest, enough of an idea may be obtained of the effectiveness of the different materials to weed out the least effective in future tests.

Experiments in applying insecticides in dust form for the corn-ear worm, onion thrips, alfalfa caterpillar, and cabbage aphid were ineffective in the case of the corn-ear worm and very effective in the case of the alfalfa caterpillar and cabbage aphid. The onion thrips were not numerous enough for a fair test. This work will be continued.

The outbreak of the black cricket (*Anabrus simplex*) was very carefully studied and baits were applied in fenced areas so that there could be no doubt of their effectiveness. It was found that 98 per cent could be killed in two days by using more white arsenic than is used in the regularly used bait. This work will be continued if the abundance of the insects justifies it.

A study of the habits of the reptiles of Utah has proven that many are extremely beneficial since they feed on many injurious insect forms. This work will be completed this year.

In addition, observations have been made on the symphlid, sugar-beet crown-borer, peach twig-borer, the pineleaf miner, and a study has been made of the parasites of the sugar-beet web-worm. Most of these insects deserve more study and it is hoped that more intensive work can be spent on them this coming year.

Future Plans and Needs

In the work for the ensuing year the department would like to increase the amount of student help. One man could advantageously be stationed for the summer in Davis County where many of the worst problems should be watched. There should also be a student assistant at Logan on full time during the summer. Cooperative work with the Department of Plant Pathology is needed in studying the transmission of potato diseases. Exclusive of this last phase of the work we could use \$800.

The development of experimental work needs an expenditure for cages, a barrel spray pump for experimental use, and some small items such as insecticides, glassware, etc. The motorcycle owned by the department has cost much more to maintain than it should. It should be replaced by some other form of transportation.

It is necessary for the men in the department to travel a great deal, and much of this can best be made by automobile. During the coming summer visits should be made to southern Utah and the Uintah Basin to make something of a survey of conditions. Three or four hundred dollars could be used for this purpose.

Summary of Needs for the Department

1 man, Station work, 7 months each year, by hour . . .	\$850
1 man, part time work, 7 months each year by hour . .	450
Expenses of men in field	400
Traveling expenses (including motorcycle repairs, mileage, etc.) for members of staff	900
Total for biennium	<hr/> \$2,500

In conclusion, it is well to point out that for efficient experimental work in Entomology it is necessary to have a light teaching schedule during the spring term and open time during June and July when insects are most active. The experimental work in Entomology should be developed as rapidly as possible to meet the many needs for it in the state.

Respectfully submitted,

I. M. HAWLEY,
Entomologist.

AGRICULTURAL ECONOMICS

To the Director of the Experiment Station:

Sir: I have the honor to report herewith the Experiment Station projects of the Department of Agricultural Economics and Farm Management for the past biennium.

At the last biennial report the Experiment Station was paying for one-half the time of the head of the department, but the past year and a half only one-third of his salary has been paid from Station funds and the other two-thirds from College funds for teaching.

In accordance with the demands of the times, the department has not enlarged its staff nor has it increased the number of projects upon which it has been working, but in order to economize for the benefit of the Institution as a whole it has kept its demands for funds at a minimum. It is difficult to see how the department could have operated at all with less money than it has had the past biennium. It cannot be maintained and do efficient work for a much longer period without additional funds to allow for growth and development.

PROJECT NO. 54 (FARM ORGANIZATION)—This project is a study of the economic production of farm products by proper organization as to farm layout, arrangement of buildings, and efficiency of labor; size, diversity, and balance of farm business; kinds, number, and uses of farm machines; and the most profitable crop and stock combinations for Utah farms and ranches. Circulars on farm layout and the farmstead are in course of preparation.

PROJECT NO. 55 (TYPES OF FARMING)—An analysis is now being made of the changes in types of farming in Utah from 1850 to the present time as revealed by the U. S. Census data, other statistics, and personal observations. In addition, a study is being carried on to determine the most profitable types of farming under conditions of soil, climate, topography, national forests, and public stock ranges. Bulletin No. 177—"Some Types of Irrigation Farming in Utah"—has been published.

PROJECT NO. 56 (MISCELLANEOUS AGRICULTURAL ECONOMIC STUDIES)—This project involves an analysis of the economic factors such as available irrigation water; markets; wagon and auto roads, and railroads; farm credits; land values; land tenure; farm labor conditions; the size and conditions of farm families; and the total and

rural population of Utah. A collection of data on the labor lost by the farmers living in town and farming their land in numerous small pieces on the outskirts of the town is being prepared. This is typical of the farming sections in this state.

RECOMMENDATIONS—It is recommended that a full-time man be employed in Station work and that a sufficient budget be allowed to carry on two projects; (1) Cost of Producing Utah Farm Products and (2) Problems of Land Economics, such as Land Settlement, Land Speculation, Land Values, Land Credit. etc.

It is estimated that an allowance of \$300 for payroll, \$50 for supplies, and \$500 for travel will be necessary for the next year.

Respectfully submitted,

E. B. BROSSARD,

In Charge, Agricultural Economics and
Farm Management.

GEOLOGY

To the Director of the Experiment Station:

Sir: I have the honor to report herewith the Experiment Station projects of the Department of Geology for the past biennium.

PROJECT NO. 25 (GROUND-WATER DEVELOPMENT)—During the biennium the study of ground water has taken on the following phases:

1. A study of structure to determine whether or not artesian water might be developed from solid rock formations. This has especially been emphasized in Rich, Duchesne, Uinta, Carbon, and Washington Counties.

2. A careful study and survey have been carried on to determine a method of measuring the quantity of ground water which might be available in the basin valleys of the state. The study has opened up a new phase in the work in that the measurement of ground water has to do directly with the amount of rainfall rather than the amount of water already found in the valley, the poorest material rather having to do with reservoir facilities than with the quantity of water available.

3. The third phase of the work has to do with the development of watering places or watering holes on the range. Many seeps and intermittent springs have been carefully inspected and methods devised for developing them into a permanent water supply for watering stock on the range. In several sections watering holes have been developed where no water appeared previously on the surface. This phase of the work merits more consideration than it has received and should receive development in the state.

The general survey of the ground-water work in the state should be looked upon as practically complete, and the future should be given to intensive study and description of specific valleys.

This work should be correlated with Project 17 and \$500 per year, or \$1,000 for the biennium, should be allowed for continuing the studies.

Respectfully submitted,

WILLIAM PETERSON,

Geologist.

HORTICULTURE

To the Director of the Experiment Station :

Sir: I have the honor to submit herewith the report of the Department of Horticulture for the past biennium.

Projects

PROJECT No. 38 (CANNING CROPS)—Three varieties of canning peas (*Admiral, Alaska, and Horseford*) were used in experimental work on cultural methods at the Davis County Experimental Farm. Three series of experiments were begun: (1) Study of the methods of planting—single row, double row, single drill space and solid planting; (2) study of the value of inoculating seed with nitrogen-gathering bacteria; (3) study of the time of application and quantity of irrigation water applied. Harvest data were calculated on the basis of number of shelled canning peas per acre. No conclusions can be drawn at this time.

PROJECT NO. 39 (UTILIZATION OF HORTICULTURAL PRODUCTS)—This project was carried on intensively during the first half of this biennium, the work being concentrated on the perfection of the apple candy. This work has been published in Bulletin No. 179 of the Station, the supply of which is now exhausted. Since that time several minor improvements were made upon the apple-candy process, and a very small amount of work has been done with other fruits.

PROJECT No. 40 (HORTICULTURAL SURVEY)—No definite work was outlined; however, several trips were taken by Dr. Merrill in the interest of such phases as fruit standardization, celery culture, and horticultural conventions.

PROJECT No. 41 (BREEDING OF HORTICULTURAL PLANTS)—The work of this project involves the testing, selecting, and breeding of canning tomatoes with the end in view of finding or producing earlier, firmer, sweeter, more productive varieties of tomatoes. The project has now been carried on four seasons. In the beginning we started with sixty-six varieties and ninety-four strains and varieties. This past year 242 strains and varieties were grown, many of these strains being duplicates. Each year we have kept careful and accurate record of each and every plant of every variety as regards date of harvest, number

and weight of culls, detailed characteristics of the plant, and detailed characteristics of the fruit. Each year careful selections have been made from the promising plants and varieties for both earliness and yield and these have been planted the succeeding year. Every year seed for comparative purposes is also planted. This seed has been obtained from the original seedhouses. Thus we have both selected and original plants. In connection with the plant characteristics this past year typical leaves of each variety have been secured for purposes of comparison and classification. There were also 171 seed selections made this past year for earliness and yield, and this seed will be planted the coming year. The results for each year are tabulated and summarized. At the end of the 1922 season, which will mark the five years of work, the plan is to summarize the results for publication and the next season to start on the work of crossing or breeding on the basis of the selections and the detailed information secured during the previous five years' work.

MISCELLANEOUS EXPERIMENTS for which no project numbers have yet been assigned:

1. STATION ORCHARD AT NORTH LOGAN—This is being sprayed, pruned, cultivated, irrigated, the fruit thinned, harvested, and sold as a demonstration or commercial orchard. No experiments are being conducted, tho it has been planned to undertake an orchard cover crop experiment in the near future. The yield of each tree is recorded each year, however.

2. ORNAMENTAL NURSERY STOCK—Six plants each of ornamental shade trees and 151 varieties of ornamental shrubs were ordered in the spring of 1920. Three of each of these were set out on the Davis County Experimental Farm and on the experimental farm at North Logan. Accurate records are made at different times each year showing the amount and character of growth, the vigor or hardiness of the plants, and the characteristics of the plants of each variety. After they have been grown about four years they will have shown fairly accurately their adaptability to Utah conditions.

3. STRAWBERRIES—Fifty-five of the best and most highly recommended varieties of strawberries grown throughout the United States were ordered in the spring of 1921 for planting on the Davis County Experimental Farm in order to determine which varieties are best

for Utah conditions. Unfortunately, a great many of these were not received and of those that came many died in shipment. Hence, it will be necessary to order more plants of the missing varieties this year.

Personnel

Dr. M. C. Merrill, Horticulturist, resigned June 30, 1922. On July 1, 1921 T. H. Abell, Assistant Horticulturist, left the Institution for one year's leave of absence, returning July 1, 1922.

Value of the Findings of the Department of Horticulture

The only project whose results are capable of measurement at this time is No. 39—Utilization of Horticultural Products.

There are about 150,000 bushels of apples annually produced in the state. It is probably safe to assume that 5 per cent of this amount, or 32,500 bushels, goes to waste or is sold at a loss because of glutted markets. Casual observation will show that there are many apples put on the market which are eventually culls.

It has been roughly figured that there is a profit of \$5.00 on each box of apples made into candy. Assuming a very conservative profit of \$1.00 per box, there could possibly come to the producers a profit of \$32,500.00, not counting the work furnished for the laborers in the factories in which the candy would be produced.

At the present time this cull fruit cannot possibly bring more than \$4,000.00 or \$5,000.00 at a cider factory or as pig feed. Furthermore, the utilization of inferior fruit relieves the market and gives a better opportunity to move the first class goods.

Plans for Future Work

PROJECT No. 38 (CANNING CROPS)—This project, in co-operation with the Department of Irrigation, will be continued as previously outlined.

PROJECT No. 39 (UTILIZATION OF HORTICULTURAL PRODUCTS)—Work similar to that done on apple candy could profitably be extended to such perishable crops as peaches and apricots. For instance, the peach crop in this state is far larger than the apple crop. This year cars were slow in coming at the right time and much of the crop was wasted. A unique product such as peach con-

fection would save much of this waste. Drying the fresh fruit in sugar seems to be a promising method of producing the results. This would probably not call for a great deal of added equipment since that already used for apples is on hand. It will, however, necessitate moving into a fireproof laboratory such as the one in the basement of the Plant Industry Building.

PROJECT NO. 40 (HORTICULTURAL SURVEY)—

A. *Greenville Apple Orchard*—As a demonstration orchard it requires more money than it is worth to the public to operate this orchard. The small size and number of varieties prevents it from being even self-supporting. It is recommended either that (1) the trees be pulled up and the land used for other purposes or (2) that an experimental project for the study of orchard tillage and cover crops be outlined. This should give us some information concerning orchard management.

B. *Ornamental Nursery Stock*—This has now been under observation for three years. It is planned to transplant this material to the College Campus in the Spring of 1923 or 1924, and that it continue to be under observation until the evidence points to its adaptability to Utah climate.

C. *Small Fruits Culture*—During the last two years about one-half the inquiries which came to the office requested information on the subject of small fruit culture. Since the station has no publication on the subject this has necessitated referring them to other stations. It is planned to publish a circular on this subject based on the practices of successful growers of the state.

PROJECT NO. 41 (BREEDING OF HORTICULTURAL PLANTS)

A. *Tomatoes*—At the end of this season the result of the last five seasons will be summarized and published. The tests of standard and new varieties will be continued, and work of hybridizing based on the results of the variety tests, will be initiated with the idea of producing an earlier sort for the canning factory.

B. *Strawberries*—The variety test and cost of production studies will be extended to other varieties and continued as outlined.

New Projects

TRUCK CROP PRODUCTION—Due to various factors a great interest has recently been created in the production of celery and head lettuce as truck crops in this state.

The acreage of celery increased more than 100 per cent this year—from 104 to 275. It is valued at \$450.00 per acre. Furthermore, the profits on these products will probably increase the plantings. This means urgent calls for information about production. A combination of high-priced land and water is the incentive for raising such intensive crops.

There are at least three distinct methods of raising celery in this state. One method requires five men for five days to hill an acre of celery once. Another method requires but one man and a team two days to do the same amount of work. Is the cheaper method practicable? Such questions as this must be answered soon.

Other questions asked are: Where shall we secure seed of the superior "Utah" celery? How can we most economically store our crop, especially when it is too green but must be dug? Similar questions are being asked about lettuce. It is therefore planned to undertake experimental work on these crops as follows:

1. Variety test of celery and lettuce.
2. Comparison of cultural methods.
3. The trial of various methods of bleaching celery.
4. Determination of dates for planting lettuce and celery.
5. Study of suitable fertilizers.
6. Cost of production in all tests.
7. Study of methods of celery seed production.
8. Methods of storing celery.

In order that this work may be done properly a large appropriation will be necessary because much of the work must be done by hand. However, this experiment should pay for itself on account of the value of the product.

Help Needed

The work of the horticultural projects is becoming so voluminous that more help is needed to accomplish proper results. There is present danger of the single present incumbent "spreading himself out too thinly." The especial needs are for the following:

1. Payroll to employ student labor to summarize the data which has been accumulating for five years on Project 41. Without extra help these data must remain on the cards until such time as extra help is forthcoming. Furthermore, unless the summarized data are available by March

15, 1923, the most valuable of the proposed future work on Project 41 will have to be held in abeyance for another season. March 15 is about the planting date for tomato seed.

2. A trained technician is needed who is capable of responsible work such as recording of field data. Since much of the work of the Department of Horticulture is on the Davis County Experimental Farm and since Mr. Wilson, the superintendent, has expressed a need for similar help in his work there, it would be desirable to get a college graduate to spend all of his time there during the growing season. This could very well be the same man whom I have asked the President of the College to secure to assist with the instructional work in the Department of Horticulture.

Estimated Needs

PROJECT 38—CANNING CROPS:

Supplies, seed, etc.	\$ 50	
Travel (Logan to Davis County Farm) ..	30	\$ 80.00
		<hr/>
Expended last biennium...	\$ 48.98	

PROJECT 39—BY-PRODUCTS:

Equipment	25	
Supplies—fruit, sugar, nuts, chocolate...	300	
Labor in laboratory	300	625.00
		<hr/>
Expended last biennium...	\$1,758.73	

PROJECT 40—SURVEY:

Supplies—photographs, etc.....	25	
Travel	200	225.00
		<hr/>
Expended last biennium...	\$ 98.43	

PROJECT 41—BREEDING:

Equipment	15	
Supplies—seeds, pots, bags, etc.....	150	
Travel	200	
Labor—calculating, selecting and cleaning seed	300	665.00
		<hr/>
Expended last biennium...	\$ 578.55	

GREENVILLE ORCHARD:

Equipment—ladders, and bags	20	
Supplies—alfalfa seed, boxes, spray....	250	
Labor—pruning, spraying, thinning, pick- ing	450	
Travel (from College to orchard)	25	745.00
		<hr/>
Expended last biennium...\$	541.00	

ORNAMENTAL NURSERY STOCK:

Supplies—photographs	60	
Travel to Greenville and Davis Co. Farm	100	
Labor—pruning and notes	60	220.00
		<hr/>
Expended last biennium...\$	126.34	

SMALL FRUIT PRODUCTION:

Equipment—barrel sprayer, sorting table	60	
Supplies—plants of various fruits..\$175		
posts, wire, boxes.....	100	275
Travel (Davis County Farm)	100	
Labor—notes, pruning.....	50	485.00
		<hr/>
Expended last biennium...\$	66.20	

TRUCK CROP PRODUCTION:

Equipment—orchard disk, hiller, etc....	100	
Supplies—seed, fertilizers, twine, crates..	250	
Travel to Davis County Farm.....	200	650.00
		<hr/>

GRAND TOTAL to June 30, 1924\$3,595.00

In addition to these items funds must be added to the Davis County Farm Budget to take care of cultural work, as follows:

Small Fruit Production (planting, trellising, and care)	\$200.00
Truck Crop Production (celery and lettuce) ..	500.00

The latter is on the basis of about one acre which will require about one man's full time for five to six months.

Respectfully submitted,

TRACY H. ABELL,

Assistant Horticulturist.

HUMAN NUTRITION

To the Director of the Experiment Station:

Sir: I have the honor to submit herewith the report of the Department of Human Nutrition for the past biennium.

Project

PROJECT NO. 50 (NUTRITION OF INFANTS). The work on this project so far has been directed towards finding a milk specially suited to the nutrition of infants. In this regard a great variation in the curd character of cows' milk was noted, and the curd test which has been developed by the department improved and utilized in more completely segregating the herd in regard to the hardness or softness of the curd. A great many chemical determinations have been made to determine the reason for the variation in curd character of the milk. The results from these determinations have been too variable to justify drawing conclusions at this time. It is planned to continue analytical work and try to solve this problem.

Personnel

During the present biennium the services of Mr. Angus M. Maughan were obtained for analytical work in the department.

Future Plans

During the coming biennium it is planned to determine if possible the reason for the great variance in the curd character of cows' milk as well as to study the effect of feed, breed of cattle, period of lactation, and mineral metabolism of the dairy cow upon the curd character of the milk. It is further planned to make surveys of the dairies in the state, testing the individual cows to determine the curd character of their milk and endeavor to have cows giving the soft-curd milk segregated for the feeding of infants. It is also planned to check on the adaptability of this milk for infant-feeding when compared to the ordinary mixed herd milk.

If funds are available for a rat colony work will be started on the feeding of the milks of various grades of curd hardness to rats.

Needs

If sufficient funds are available a full-time assistant should be added to the department. At present the department only has the services of one man one-fourth time. This does not allow sufficient time for consecutive and careful work such as is necessary for the successful completion of this problem. It is estimated that the services of this assistant would probably cost from \$1,500 to \$2,000 per year, making \$3,000 to \$4,000 for the biennium. In addition to this payroll help to the extent of \$240 per year, or \$480 for the biennium, should be provided.

The approximate chemical needs for supplies and equipment will be \$500 per year, or \$1,000 for the biennium. Laboratory animals and cages should approximate at least \$200 for the biennium. Traveling expenses should approximate at least \$500 for the biennium.

If no funds are available for a full-time assistant payroll help to the extent of \$500 to \$800 per year, or \$1,000 to \$1,600 for the biennium, should be provided. Equipment and supplies would probably be reduced to about \$300 per year, or \$600 for the biennium. Traveling expenses would then be about \$500 for the biennium.

Respectfully submitted,

R. L. HILL,

In charge, Human Nutrition.

IRRIGATION AND DRAINAGE

To the Director of the Experiment Station:

Sir: I have the honor to report herewith the work of the Irrigation and Drainage Department for the past biennium.

Projects

PROJECT NO. 13 (IRRIGATION OF SEVIER FARM). Sugar beet yields were found to vary from 8 tons an acre with 18 acre-inches of water to 10.8 tons an acre with 36 acre-inches. At current local prices of land, labor, and water the maximum yield was the most profitable. Alfalfa yields varied from 2.5 tons an acre with 16 acre-inches to 4.5 tons with 42 acre-inches. Potato yields varied from less than 40 bushels an acre with 26 acre-inches. As with the beets, the maximum profits for alfalfa and potatoes were obtained with the maximum yield which was produced by the maximum amount of water used in the experiments. The field work in this project was closed during the fall of 1920. Results of seven years' duty-of-water experiments have been published as Station Bulletin 182.

PROJECT NO. 14 (CEDAR CITY FARM). This project was closed in the autumn of 1919 and a report of the three years' work on it has been published as Station Bulletin 181.

PROJECT NO. 15 (PUMPING FOR IRRIGATION). This project has been designed for the following purposes:

- A. To find economical methods of developing ground-water.
- B. To ascertain where ground-water is available in quantity sufficient for irrigation at depths close enough to the surface to make pumping profitable.
- C. To determine the amount of water which may be pumped from any well at different depths of draw-down in order that suitable equipment may be installed.
- D. To determine efficiency of pumps and of pumping plants in operation.

Some accomplishments during the biennium are as follows:

- A. At Vernon in Rush Valley three wells were completed by co-operative endeavor and were tested for capacity. The smallest capacity was 400 gallons per minute and the largest capacity was 1,000 gallons per minute. These tests were for short runs only and no attempt is made at this time to state whether this flow will maintain. The result of the work has been to encourage local landowners to renewed activity in placing under irrigation lands which were unsuccessful as dry farms.
- B. At Milford on June 30, 1922, thirty-five new wells had been developed and placed in operation.
- C. In the Escalante Valley three new wells have been developed but not tested.
- D. At Plymouth in Boxelder County a test of the available ground-water was made to a depth of 400 feet which resulted in only a small development.
- E. At Brigham City tests of 40 pumping plants were made in 1921 to determine amount of water available for irrigation in a given area. These tests were repeated in 1922 to check the previous work and in addition to determine the efficiency of each plant in operation by measuring the put-in of power and the out-put of water.

Altogether fifteen wells were tested in Beaver County, four in Davis County, fourteen in Millard County, four in Weber County, and two in Tooele County.

PROJECT NO. 16 (AMOUNT OF IRRIGATION WATER TO APPLY). No systematic work has been done on this project during the past biennium.

PROJECT NO. 17 (SOIL MOISTURE CONSTANTS). Measurements have been made of the apparent specific gravity of soil in its natural state in each foot section of soil to a depth of 12 feet by two distinct methods. The ordinary method of inserting small cylinders into the soil to a

depth of a few inches was checked by means of carefully measuring the volume of 2 cubic feet of soil in place with the use of engineering instruments. A close agreement of results was found.

PROJECT NO. 18 (IRRIGATION INSTITUTIONS). Some observations have been made under this project with reference to the effect of recent Utah legislation pertaining to water-rights and to irrigation district activity.

PROJECT NO. 58. (ASHLEY VALLEY STUDIES). The work of this project, which was begun in 1920, is classified as follows:

- A. Cross Duty-of-water Studies.
- B. Net Duty-of-water Studies.
- C. Preparation of Land Ownership Map showing the Location of Canals and Laterals.

A. *Cross Duty-of-water Studies.* Records were kept of discharges of all the canal and the creeks. These investigations show excessive amounts of water used in May and June and insufficient amounts in July and August. Seepage measurements were made on the creek and main canals.

B. *Net Duty-of-water Studies.* Experiments conducted on seven fields representing main soil types in various parts of the valley show large differences in the capacities of soil to retain water and consequently in the number of irrigations necessary. The data from the soil survey conducted by the Station were used in locating these experiment fields for 1921.

C. *Preparation of Land Ownership Map.* The collection of data for this work has been completed. Alignment surveys were made on the Rock Point and Upper Canals and laterals of the Central, Upper, and Rock Point Canals. Profile surveys were made on the Rock Point, the Central, and Upper Canals. Ownership records were procured from the county recorder's office. All additional data needed were procured from the records of previous surveys. In addition to the regularly outlined work measurements of transmission losses when water was conducted in natural channels from mountain reservoirs to the irrigated section in the valley showed that 20 to 40 per cent of the water diverted from the reservoirs was lost in conveyance. Pronounced improvement in the methods of water delivery

were instituted. Further studies of storage possibilities and conveyance losses of natural streams were conducted during 1922. A detailed report including hydrographs, profiles, and maps has been prepared and submitted to the companies concerned.

Plans for Future Work and Needs

PROJECT NO. 15. (PUMPING FOR IRRIGATION) should be continued. Special emphasis should be given to a study of the efficiency of small irrigation pumps. During the next two years this work should be confined largely to a study of pumps at the water measurement laboratory just completed. Clearly such work on the campus is relatively less expensive than similar work conducted on many pumping plants on the farms of the state. The field work should be limited to the most favorable and least expensive plants. The testing of wells for capacity and draw-down now well begun should be continued where possible with the equipment now on hand.

In order to do this work effectively a capable graduate of a leading engineering institution who has had experience in ground-water investigations should be employed at a beginning salary of approximately \$2,000, one-half of which should be paid from College funds for service as an instructor in irrigation during the Winter and Spring quarters.

For payroll help, minor equipment, and traveling expenses the engineer in charge of this project should be allowed not less than \$1,500 a year, thus making a total Station salary budget of \$2,500 a year. The work could be well begun before May, 1923; consequently, \$3,500 would suffice for the biennium ending June 30, 1924.

PROJECT NO. 16 (AMOUNT OF IRRIGATION WATER TO APPLY) should be vigorously developed during the biennium. To attempt this work in a superficial manner is useless. The completion of Project No. 58 (Ashley Valley Studies) at the end of the next calendar year, together with the completion of the design and construction of the water measurement laboratory, will make it possible fully to develop Project No. 16. For this project a fund of \$2,000 a year should be provided to cover payroll and traveling expenses together with the cost of minor equipment. This may well be made on Adams or a Hatch Fund project.

PROJECT No. 17 (SOIL MOISTURE CONSTANTS) should be continued co-operatively with the Department of Physics. It is planned to give careful attention to the range of variation of the optimum moisture content under field conditions, the studies to be made on the alfalfa plants of the Greenville Farm which were prepared this year. To do this work properly a payroll and expense fund of \$1,200 a year or \$2,400 for the biennium will be necessary. This estimate does not include the needs of the Physics Department for mathematical analysis and laboratory investigations of soil-moisture relationship.

PROJECT No. 58 (ASHLEY VALLEY IRRIGATION INVESTIGATIONS) will be continued during the calendar year 1923 at the expense of the Ashley Valley canal companies that have supported the investigations during the three years, 1920-22, inclusive, at a cost of approximately \$9,000. The Station should contribute the time of its Geologist to carefully examine and report on the structure of the formations in which sinks and springs occur and also the time of the head of the Irrigation Department to direct the field studies including the tracing of the motion of the ground-waters that are in question.

Summary of Needs for the Biennium

Project No.	Name	Amt. Needed
15—	Pumping for Irrigation	\$3,500.00
16—	Amount of Irrigation Water to Apply	4,000.00
17—	Soil Moisture Constants.....	2,400.00
58—	Ashley Valley Studies (Salary allowance—no budget)	
Total.....		\$9,900.00

Respectfully submitted,

O. W. ISRAELSEN,

In Charge, Irrigation and Drainage.

MARKETING

To the Director of the Experiment Station:

Sir: I have the honor to submit herewith the report of Project No. 63 (Marketing Utah Fruit) for the past biennium.

Work on this project was begun in June, 1921 under a co-operative agreement between the U. S. Department of Agriculture (Bureau of Markets) and the Utah Agricultural Experiment Station. The object was to study the marketing of Utah fruits for the purpose of arriving at a scientific basis for improvement in methods of handling and marketing.

In the limited time available for the work, preliminary investigations have been made in the principal producing areas and at the central shipping points. While the information secured was inadequate to serve as the basis for final conclusions, it has been very helpful in extension and classroom work.

The present status of the project is somewhat uncertain. The subject is an important one and more work should be done, but because of the termination of the co-operative agreement with the Federal Department and the fact that the investigator is fully occupied with other work other plans will have to be made before the work can be carried further. Until this is done the help that will be needed and the budget requirements cannot be estimated.

Respectfully submitted,

W. L. WANLASS,

In Charge, Marketing Research.

POULTRY

To the Director of the Experiment Station:

Sir: I have the honor to submit herewith the report of the Poultry Department for the past biennium.

During the past biennium four projects have been carried on by the Poultry Department. These projects have been of such a practical nature that the results have been sought and put into immediate practice by many of the poultry producers of this section as soon as definite information could be obtained.

Projects

PROJECT NO. 36 (BREEDING FOR EGG PRODUCTION)—This work was started in 1907. The aim was to study annual egg production for the same hens for several years and if possible develop a strain of fowls that would be profitable for a period of at least three years, the general idea of the poultry raisers at that time being that hens were profitable for only one year. The highest individuals in the flocks selected as a foundation for this breeding work averaged about 500 eggs for the three years, while the flock average was only about 381 eggs. This strain has been developed until at the present time several birds have recently finished their third year with a total production of over 600 eggs and the flock's average has been considerably increased. The value of such results can be appreciated more when it is known that the average of the United States as a whole is only about 72 eggs a year for each hen, while for Utah this average, according to the 1920 U. S. Census Report, is about 84 eggs.

This work should be continued for several years so that the farmers and breeders of the state may receive immediate benefit from the methods used and also be able to buy surplus pedigreed breeders at a nominal price so as to develop their flocks into better producers.

PROJECT NO. 37 (A STUDY OF INCUBATION PROBLEMS). As a result of the early work of this project it was found that the moisture problem, or control of evaporation from the eggs during the incubation period, was necessary for the successful hatching of chicks. Definite methods for the control of this problem have been developed. During the past two years a study of time of hatching and its effect on subsequent production for the first, second, and

third years was begun. Only the first year's egg production of the hens in this project is available, and from these results it is found that the production of a hen for the first year may vary from one to three dozen eggs, due to the time of hatching when other factors are the same.

PROJECT NO. 47 (THE USE OF ARTIFICIAL LIGHT AND ITS EFFECT ON PRODUCTION)—There has been no problem on which information has been so eagerly sought and applied by poultry producers in general as that of how to use artificial light and its effect on production. As a result of the information obtained from careful study of this problem it has been found that with the proper use of light during the long winter nights the poultry raiser may obtain two or three times as many eggs during the winter months and thus bring about a better distribution of production and greater profit. It has also been found that the improper or over-use of lights while increasing winter production may affect the vitality of the hen and thus actually reduce the year's production.

PROJECT NO. 57 (POULTRY FEEDING)—This project was started in November, 1920 to determine what part corn silage might play as a part of the ration for laying hens and the relative value of various amounts of animal products in combination with the common grain feeds. The first year's results were very decisive, indicating that the effect of feed might cause a variation in production from 58 to 184 eggs for each hen for the year.

It was soon found that corn silage was not very profitable for fowls except the grain or kernels of corn and that it was difficult to get the hens to eat any considerable amount of the pulp or fodder. It did not seem to supply any particular nutritive value, as indicated by the results obtained the first year. The pen of fowls fed the basic grain ration and silage averaged only 58 eggs per bird for the year as compared with 184 eggs in the pen where the fowls were fed alfalfa leaves, milk, and meat meal in addition to the basic grain ration.

The first year's results indicate that the lack of certain nutrients in a ration would reduce production to such a point that the eggs produced would not pay for the feed consumed. The addition of these nutrients increased production so that there was a return of over \$3.25 per bird above feed cost.

This project should be continued for several years and various feeds and combinations of feeds tested until the best combination of home-produced feeds is determined and also the feeds necessary to give best results in production and profit.

Personnel

There has been no change in the personnel of the department during this period. In July, however, Mr. Vernal Willie of the 1922 graduating class, was employed as assistant, part of his time being devoted to teaching vocational students and part of his time devoted to extension work. It is thought that the present staff can handle the work of the department for the next two years with the addition of about \$200.00 a year, or \$400.00 *for the biennium*, for payroll help.

Needs

In addition to the \$400.00 mentioned above for payroll help, it is estimated that \$4,800.00 for the biennium to allow for equipment, feed, supplies, etc., will take care of the work of the department.

There is one addition that would add materially to the efficiency of the department. This is the erection of a small residence at the poultry yards so that one of the men working there could be in immediate touch with what is going on at night after working hours and on Sundays and holidays.

Respectfully submitted,

BYRON ALDER,

Poultryman.

PHYSICS

To the Director of the Experiment Station :

Sir: I have the honor to submit herewith the report of the Department of Physics for the past biennium.

The research work in the Department of Physics during the past biennium has been confined to Project No. 17 and problems incidental thereto. This project has been designated "Soil Moisture Constants" and is listed as a project of the Department of Irrigation.

The primary purpose of the investigation has been to make a careful analysis of the various fundamental factors entering into problems of irrigation and drainage practice, including problems pertaining to the pumping of underground water.

It has been approached as a problem in hydromechanics, and in order to make satisfactory progress it has been found necessary to resort to mathematical methods in the theoretical analysis of the problem. The general solution has been found to contain two important soil moisture functions, viz., the capillary potential function and the capillary transmission function, and in order to apply the solution to problems which occur in practice it has been found necessary to develop experimental methods by means of which these functions may be measured for various moisture contents and for various soils. The work for the biennium has been centered about the task of developing these methods. Several technical articles have been published giving the theoretical background upon which the work has been based, together with tentative experimental results which have been obtained from time to time. An article is in process of preparation which will contain a somewhat more popular discussion of the subject and also an application to an important problem encountered by engineers in drainage practice.

Although progress in such work is of necessity comparatively slow, the results that are being obtained are very gratifying, and it is expected that the investigation will ultimately play an important part in the guidance of other investigators and in the practice of irrigation and drainage throughout the West.

Notwithstanding a somewhat limited payroll, it has been possible to stimulate the interest of several advanced students of the Institution and a great deal of material assistance has been obtained from them with a nominal

financial remuneration. The department has also enjoyed the very hearty co-operation of other departments in the matter of the use of equipment and supplies and in other ways.

Assistance has also been rendered other departments in the matter of the analysis of experimental data, projecting new plans, devising new apparatus, examining manuscripts for proposed research reports, and in other ways. In particular might be mentioned assistance in the design and construction of apparatus for a new method of mechanical analysis of soils, which has recently been reported in the form of a joint publication of the Department of Soil Surveys and the Department of Physics.

Some attention has also been given to the theoretical analysis of the problem of the duty of irrigation water, the result of which is not only an exact and reliable method of approach of the problem but the substitution of a new and more reliable recommendation to the farmers for the use of irrigation water. This analysis has developed into a very general theorem which may be applied to the analysis of discussing the theoretical and practical aspects of this subject.

During the fore part of the biennium a considerable amount of work was done by Dr. F. L. West and Mr. N. E. Edlefsen in meterological investigations, the results of which have been published in the form of articles for the technical journals and also in bulletin form.

The department has taken the attitude that sound and thorough analytical methods alone must be adopted, reliability and permanence in the results of scientific work being given greater weight than quantity of experimental data accumulated. The literature has been carefully analyzed and the obtaining of unnecessary and irrelevant experimental data has been avoided. In some cases it has been necessary to repeat experiments that have been done before by other investigators for the reason that the conditions have not been carefully controlled and the results have been in such encyclopedic form as to render them unavailable. The findings of the department have been rated as unique in some respects, and it is hoped that a type of service may be rendered that will materially assist in the promotion of the science of agriculture.

Respectfully submitted,

WILLARD GARDNER,

Associate Physicist.

RANGE MANAGEMENT

To the Director of the Experiment Station:

Sir: I have the honor to report herewith the Department of Range Management for the past biennium.

The work in Range Management during the past biennium has consisted primarily in a survey of range conditions in the state. The object of the survey has been to determine in detail the types of vegetation used for forage, the habitat of each type of forage and its locality with reference to elevation, plains, mountains, etc., the period of maturing so as to know the best time the plants adapt themselves for most economic forage and the carrying capacity of each locality.

The survey has also had the object of learning in detail the methods used by stockmen of the state in ranging their herds and flocks and to ascertain whether this is being done economically or whether the carrying power can be increased by new methods.

Special attention has been given to poisonous plants and much instruction given directly as to how to combat them. Some study has been given to winter range and winter range forage—enough to show that there are great possibilities in the development of winter forage plants. The work has been developed to the point that fenced areas under control are necessary in order that the studies may go forward with most promise.

The authorities of the National Forest have expressed a willingness to cooperate in this measure, and special requests are being made that areas may be fenced for experimentation and continuing the studies already started.

Respectfully submitted,

R. J. BECRAFT,

In Charge, Range Management.

SOIL SURVEY

To the Director of the Experiment Station:

Sir: I have the honor to report herewith the Department of Soil Survey for the past biennium.

Project

PROJECT NO. 49 (SOIL SURVEY)—The field work of this department has been confined to field classification studies largely within the Uinta Basin. An area of 295,000 acres, located entirely in Uinta County, has been mapped. This area is composed of approximately 150,000 acres of cultivable and 145,000 acres of rough, broken land. The soils of the cultivable land have been classified into families, series, and types, and representative samples of each type have been collected and prepared for analysis. Many of the fields that have been cleared and planted to farm crops will return to pasture because the soils are old and have developed a calcareous stratum in the profile. Where this stratum is close to the surface the root zone is restricted and the water-holding power of the soil so limited that farmers will not be able to compete with those on better soils.

The alkali areas have been mapped on 50,000 acres of the total area mapped, and samples of soil representative of alkali areas have been collected from the entire area.

LABORATORY WORK—The laboratory work has been prosecuted along the following lines:

(1) Chemical Analysis

- (a) Of alkali samples*
- (b) Of Type samples for
 1. carbonate carbon
 2. organic carbon
 3. total nitrogen
 4. total phosphorus

However, only a start has been made on this phase of the work.

*In addition, help was given to the engineers promoting the organization of drainage districts in Cache County. Fifty-eight samples of soil from alkali areas were analyzed for total salts, calcium magnesium, and for carbonates, bicarbonates, sulfate, and chlorine.

- (2) Mechanical Analysis—In this phase of the work the department was handicapped until a short time ago by not having adequate equipment. In co-operation with the Agronomy and Physics Departments a new method of analysis has been worked out. A paper describing the method has been accepted for publication by SOIL

SCIENCE. Its unique features are as follows:

- (a) It is rapid. In comparison with the common method in the United States it will allow at least ten times the output of work for the same man power.
- (b) No expensive equipment is essential to its prosecution.
- (c) It is especially applicable to clay soils and makes possible the determination of the colloidal content of soils.
- (d) The method is sufficiently accurate that it will allow a study of the factors causing flocculation (granulation) and deflocculation (puddling). Such a study is now being prosecuted in cooperation with the Agronomy Department.

With these factors and the colloidal content of a soil we shall have valuable information on the management of clay soils.

GENERAL—In the Delta Area it is found that all types of soil belonging to the Gordon and Abbot series, soils of darker color and higher humus content, lie between the 4,575—and 4,600—foot contours, and by far the greatest areas of these series lie between the 4,580—and 4,590—foot contours, altho the area covers a change in elevation of more than 60 feet. Since these soils are dark in color and therefore high in organic matter, this suggests a moisture condition favorable for plant growth which may have been brought about by a temporary halt in the receding waters of Lake Bonneville.

Departmental Needs

The needs of the department for the next biennium are as follows:

A. ASSISTANCE

Field man	\$ 3,600
Laboratory assistant	2,000
Payroll	400

Total	\$ 6,000
-------------	----------

B. GENERAL

Equipment	\$ 1,000
Supplies	1,000
Travel	800

Total	\$ 2,800
-------------	----------

Grand Total for biennium	\$8,800
--------------------------------	---------

Personnel

Mr. H. E. Flanders, a graduate of the Utah Agricultural College, was appointed as an assistant in this department on July 1, 1921.

Future Plans

Plans are being made for supplementing the reports of the U. S. Bureau of Soils with the Station publications. These reports should contain chemical and mechanical analysis of each soil type and definite recommendations on soil management including rotations of crops. To do this with safety, however, it will be necessary to prosecute two lines of work that have, to date, been neglected: (1) Greenhouse studies should be made on many of the important soil types to determine the merits of practices and teachings; (2) those practices and teachings indicative of promise should then be carried to field plats.

We should like to bring about these studies on the soils of the Delta Area and the budget estimate given above would, I think, cover these lines of work. This would be true only in case an alfalfa-seed farm is established somewhere in the Delta Area and the soil survey should be allowed to co-operate with the department carrying on the seed investigation.

Respectfully submitted,

D. S. JENNINGS,

In charge, Soil Survey.

EXTENSION DIVISION

To the President of the College:

Sir: At the close of the previous biennium the Extension Division was just emerging from the war time program which necessitated many changes, including the withdrawal of a number of war emergency agents and specialists. With the relapse of war emergency funds it became necessary about the beginning of the present biennium to readjust the Extension Division forces. This readjustment took considerable time and as a result the number of workers was necessarily at a low mark.

During the latter year, however, the work of reorganization has been practically effected.

The primary aim in this reorganization has been to hold county agricultural agents in all of the counties or districts where the demand for them was made. The next aim was to place home agents in a few of the very large counties and to district the remainder of the State with a home agent over each. She was to organize and conduct the work locally with the help of the agricultural agent. The third aim was to place state subject matter specialists to aid these county extension agents in putting across the local programs of extension work. The needs and demands of the people and of the county extension agents determined largely the lines of work for which specialists were chosen.

Difficulty has been experienced in filling some of the specialist positions. This is especially true of the work in foods. It is hoped that this position will be filled with a competent worker at an early date.

The demands for special aid have been so enormous that the Extension Division has been compelled to take on part time workers and to call on the Experiment Station and the teaching staff for additional help. This arrangement with the Experiment Station and College teaching staff has made it possible to extend many services which could not otherwise have been met.

Practically the entire agricultural staff of the Extension Service is now quartered with the resident teaching or Station staff. This establishes a central base for all information but the staff is administratively responsible to the Extension Service and operates in the field under its direction.

In the reorganization work the three departments of county agents, home agents, and club agents, have been combined into two departments, namely: work with men and boys, and work with women and girls, thus eliminating one supervisory office due to forced economy.

During the biennium marked progress has been made on the program-of-work plan. The annual program has been strengthened and a permanent program practically outlined for a period of from four to seven years. This program has already been approved by the program-of-work committee of the Utah State Farm Bureau and will be presented to other organizations desirous of co-operating in its realization.

Frequent staff meetings have been held where the work has been discussed and policies and plans worked out.

On December 1, 1922 the following Extension staff members were at work:

EXTENSION DIVISION STAFF

R. J. Evans, Director.

Specialists—State Wide

		Address
J. C. Hogenson,	Agronomist,	Logan
John T. Caine, III.	Livestock,	Logan
J. H. Linford,	Correspondence Study,	Logan
Ben R. Eldredge,	Dairying, $\frac{7}{8}$ time	Logan
Rozina Skidmore,	Clothing	Logan
Victoria B. Christensen,	Home Health and Nursing	Logan
Emil Hansen	Landscape Gardening, $\frac{2}{3}$ time	Logan
Byron Alder,	Poultry, $\frac{1}{3}$ time	Logan
B. L. Richards,	Plant Pathology, $\frac{1}{3}$ time	Logan
L. M. Winsor,	Irrigation and Drainage	Logan
Vernal Willie,	Poultry, $\frac{2}{3}$ time	Logan
H. J. Pack,	Entomology, $\frac{1}{3}$ time	Logan
L. D. Hardy,	Correspondence Study,	Logan
Chas. J. Hart,	Agent in Marketing,	Logan
Rena B. Maycock,	State Home Demonstration Leader,	Logan

County Home Demonstration Agents

	Address	County
Ivy Lowry,	City and County Bldg., Salt Lake City, Utah	Salt Lake
Amy J. Leigh,	Federal Building, Provo, Utah	Utah
Ellen Agren,	218 Federal Building, Ogden, Utah	Weber

District Home Demonstration Agents

	Address
Ethel Richert	Logan
Katherine Adams	Logan
Christine B. Clayton	Logan
Lillian Elder	Logan

County Agricultural Agents

W. W. Owens, County Agent Leader—Logan

	Address	County
H. A. Christiansen,	Beaver, Utah	Beaver
R. H. Stewart,	Brigham City, Utah	Box Elder
R. L. Wrigley,	Co. Court House, Logan Utah	Cache
O. P. Madsen,	Price, Utah	Carbon-Emery
W. J. Thayne,	Farmington, Utah	Davis
Alma Esplin,	Cedar City, Utah	Iron
A. E. Smith,	Nephi, Utah	Juab
DeLore Nichols,	Morgan, Utah	Morgan
Morgan P. McKay,	Junction City, Utah	Piute-Garfield
V. L. Martineau,	City and County Bldg. Salt Lake City, Utah	Salt Lake
C. O. Stott,	Manti, Utah	Sanpete
Geo. F. Holmstead,	Richfield, Utah	Sevier
S. R. Boswell,	Coalville, Utah	Summit
A. L. Christiansen,	Tooele, Utah	Tooele
Erastus Peterson,	Vernal, Utah	Uintah
J. P. Welch,	Federal Bldg., Provo	Utah
E. R. Price,	Heber City, Utah	Wasatch
W. P. Thomas,	218 Federal Building, Ogden, Utah	Weber

The following positions were vacant on the above date:

Foods Specialist.

County Agricultural Agent, Millard County.

County Home Demonstration Agent, Box Elder County

CHANGES IN PERSONNEL

County Agricultural Agents:

A. E. Smith was transferred as County Agricultural Agent from Wayne to Millard County, December 20, 1920.

Alma Esplin resigned as County Agricultural Agent in Iron County, January 31, 1921.

W. P. Thomas, County Agricultural Agent, Weber County, was granted a leave of absence, March 31, 1921.

Charles J. Sorenson appointed County Agricultural Agent in Weber County, April 1, 1921.

Morgan P. McKay appointed County Agricultural Agent, At Large, June 1, 1921.

Clarence M. Aldous resigned as County Agricultural Agent in Piute County, June 30, 1921.

A. E. Smith resigned as County Agricultural Agent Millard County, June 30, 1921.

Morgan P. McKay was transferred from County Agricultural Agent, At Large, to Garfield and Piute Counties, July 1, 1921.

Ardath L. Price appointed County Agricultural Agent, Iron County, July 1, 1921.

O. P. Madsen appointed County Agricultural Agent in Carbon and Emery Counties, July 1, 1921.

J. H. Wittwer resigned as County Agricultural Agent in Uintah County, August 15, 1921.

A. E. Smith appointed County Agricultural Agent in Juab County, August 16, 1921.

Ardath L. Price resigned as County Agricultural Agent in Iron County, August 31, 1921.

Alma Esplin reappointed County Agricultural Agent, Iron County, September 1, 1921.

Charles J. Sorenson resigned as County Agricultural Agent, Weber County, September 15, 1921.

W. P. Thomas reappointed County Agricultural Agent, Weber County, September 16, 1921.

Erastus Peterson appointed County Agricultural Agent, Uintah County, September 1, 1922.

County Home Demonstration Agents:

Mrs. Minnie J. Smith resigned as County Home Demonstration Agent, Wayne County, December 20, 1920.

Miss Hettie White resigned as County Home Demonstration Agent, Utah County, May 31, 1921.

Mrs. Christine B. Clayton resigned as County Home Demonstration Agent, Iron County, June 30, 1921.

Mrs. Christine B. Clayton appointed County Home Demonstration Agent in Utah County, July 21, 1921, and resigned from said position August 31, 1921.

Mrs. Anna E. Pixton resigned as County Home Demonstration Agent, Salt Lake County, September 30, 1921.

Mrs. Rose H. Widtsoe resigned as Urban Home Demonstration Agent, Salt Lake City, September 30, 1921.

Miss Ivy Lowry appointed County Home Demonstration Agent, Salt Lake County, January 1, 1922.

Miss Ethel F. Richert appointed District Home Demonstration Agent, covering Sanpete, Sevier, Piute, Summit, Wasatch, Morgan and Cache Counties, March 1, 1922.

Mrs. Effie W. Madsen resigned as County Home Demonstration Agent, Box Elder County, June 30, 1922.

Mrs. Christine B. Clayton appointed District Home Demonstration Agent, covering Iron, Beaver, Juab and Cache Counties, July 1, 1922.

Miss Katherine Adams appointed District Home Demonstration Agent, covering Piute, Garfield, Sevier and Sanpete Counties, July 1, 1922.

Miss Lillian Elder appointed District Home Demonstration Agent covering Emery, Carbon and Tooele Counties, July 1, 1922.

Miss Ethel Richert transferred as District Home Demonstration Agent, covering San Pete, Sevier, Piute, Summit, Wasatch, Morgan and Cache Counties, to cover Wasatch, Summit, Morgan and Davis Counties, July 1, 1922.

Junior Extension:

E. W. Robinson resigned as County Club Agent, Weber County, December 18, 1920.

Chase Kearl resigned as County Club Agent, Cache County, January 1, 1921.

Miss Gladys L. Christensen appointed Assistant State Club Leader, May 1, 1921.

Ardath L. Price resigned as County Club Agent, Iron County, June 30, 1921.

Forest Slauch resigned as County Club Agent, Uintah County, October 15, 1921.

Gladys L. Christensen resigned as Assistant State Club Leader, June 15th, 1922.

Specialists:

Ben R. Eldredge transferred from Farm Management Demonstrator to Dairy Specialist, July 1, 1921.

John T. Caine III appointed Live Stock Specialist, August 1, 1921.

Miss Charlotte E. Dancy resigned as Home Health and Nursing Specialist, November 30, 1921.

Mrs. Victoria B. Christensen appointed Home Health and Nursing Specialist, January 1, 1922.

Specialists' Itineraries

The State Extension Office submits its program of work to the County Extension Agents, indicating what help will be available on the different projects. With this as a guide, and taking into consideration the special needs of their own county, the County Extension Agents plan their county program of work.

Where state projects are chosen, if the agents are unable to carry on the work unassisted, a request is sent in to the state office for specialist help. Except in emergency cases these requests are expected to reach the office considerably in advance of the date the help is desired.

From these requests the itineraries of the Extension Specialists are planned by the committee on organization, with the aid of the specialists themselves, for from thirty days to three months in advance.

So far as possible but one specialist is allowed at a time in any county. This is to insure the undivided attention of the agents and the maximum of benefit from the efforts of the specialist.

All itineraries are worked out carefully with a view to covering the greatest number of counties or communities with the least possible expense in time and money.

All individual requests from the counties for the help of state extension specialists must come through the county extension office.

Where an emergency request comes in for a visit from a specialist, at any distance from headquarters, the extension agents along the line of travel, or in adjoining counties, are immediately communicated with in anticipation of requests for help in the same line of work.

Round-Ups

One Round-Up was held at the College in 1921 with a fairly good attendance. One of the principal features of this event was project leaders' training courses given to prepare local project leaders to effectively lead their local groups through a successful year of extension work.

A similar event was put on at the Branch Agricultural College at Cedar City, but with the principal emphasis placed on general class work for men and women. This event was again repeated at Cedar City in the winter of 1922 with success.

The registration at these Round-Ups was 400 women, 305 men, or a total of 705.

In 1922 the Round-Up was changed somewhat for the Logan event. A two week intensive short course was given in seventeen different subjects to prepare men and women for leadership and practical farm and home problems. The registration at this short course was 44 women, 52 men, or a total of 96.

Each year in April a special one week course is given at the College in the training of project leaders for boys' and girls' club work. This event has grown more popular each year and has grown in definiteness and results. The reason for making this event special is to meet the demand for a particular type of instruction adapted to boys and girls ranging in age from ten years and up. Sleeping quarters were provided for the leaders by the College and meals were served at cost in the cafeteria and all registrants were under strict supervision and discipline both day and night.

The registration was as follows for 1921: 74—35 girls and 39 boys, and for 1922: 68—38 girls and 30 boys.

Records show clearly that such method of training local leaders is very much worth while. The percentage completing the work is very much higher and the work done very much better than by those not attending the leaders training course.

Institutes

The development of the county extension agent system with the local program of work has necessarily changed materially the system of institute work. It has been modified to meet the demands for special drives to aid in putting across the local program. It is still used to cover the unorganized counties without extension agents and is in very strong demand. The aim has been to cover all such counties at least once each year with several agricultural and home economics specialists. This type of service has been carried into 30 communities with 31 meetings, with a total attendance of 1,858 persons.

These institutes are arranged in organized counties by the committee on methods and by the Director in unorganized counties.

Due to the many calls for this type of work it is planned to extend the service somewhat during the coming biennium.

Equipment

The few remaining cars owned by the Extension Service at the beginning of the biennium were sold so that no cars are now owned by this Service. The increase in available educational films and the demand for this type of service prompted the Extension Service to purchase a moving picture outfit.

Twelve army tents were purchased to be used in housing project leaders and farmers encampment visitors. The Logan Chamber of Commerce duplicated the number of tents to be loaned to the College for similar purposes.

Fairs and Exhibits

In 1921 the Extension Service had charge of placing an exhibit at the State Fair, which emphasized work in irrigation, drainage, poultry management, dairy, hogs, home library and arrangement of homes for convenience and efficiency of work.

In 1922 this Service co-operated with the Experiment Station in making the display at the State Fair. The work was under the direction of the Station.

Judges have been furnished each year to judge exhibits at county fairs. This includes the judging of livestock, crops, fruit, vegetables, poultry, sewing, and cooking.

Exhibits of plant diseases have been prepared by the pathology specialist to be placed permanently in the offices of the county agents. These include herbarium specimens and diseased plants preserved in bottles by means of chemicals.

Exhibits of standard varieties of grains are being prepared by the agronomy department to be placed in the offices of county agents.

Farm Management

In 1921 cost of production records were started on 40 dairy farms, but only a small number completed records, due to the extremely large amount of work required to keep up the records. Work was continued on the simple farm record books. Farmers were aided in entering their inventories and in starting the receipts and expense items. Later in the year they were also aided in checking the records.

During the biennium 294 record books were kept under the direction of the agents. A revised edition of the account book has been prepared for publication.

Publications

The Extension Service has issued since August 1, 1920, a monthly Extension News, which is intended to keep county extension agents, project leaders, farm bureau officers and others informed on the progress of extension work. This is sent out to 1,200 persons each month.

A large number of mimeographed sheets have been gotten out, giving project outlines and instructions for carrying out the work.

Following is a list of publications issued during the biennium:

Publ'n	No.	Cost	TITLE	No. pp.
1921				
1, Vol. 9 Jan.	800	\$36.00	Program Farmers' Round-Up, Logan.....	8
2, Vol. 9 Jan.	800	36.00	Program Housekeepers' Conference, Logan	8
Jan.	400	7.50	Lessons in Home Music and Recreation. By Evangeline Thomas	6
Feb.	500	8.75	"The Lawn", By Emil Hansen.....	1
Feb.	500	8.75	Trees and Shrubs For the Home Grounds. By Emil Hansen	3
May	100	3.25	The Russian or Domestic Sun Flower For Silage, By B. R. Eldredge.....	5
June	1000	42.00	Poultry Record Books For Boys' and Girls' Clubs.....	8
June	1000	32.15	Sewing Record Books for Boys' and Girls' Clubs.....	8
Aug.	7500	42.00	Folder on Encampment.....	4
4, Vol. 9 Aug.	800	21.50	Program First Annual Summer Encampment.....	4
1922				
Jan.	500	14.00	Program For Short Course, Logan.....	4
April	1000	10.50	Songs For Club Schools.....	4
May	1000	20.13	Clothing Record Books For Junior Extension Work.....	8
5, Vol. 9 May	3000	83.56	Plannin and Planting if Home Grounds. By Emil Hansen..	12

Farmers' Encampment

The First Farmers' Encampment was held at the College, August 2 to 5, 1921. The entire delegation was housed on the campus in tents, and in large rooms of the College buildings. A large number of tents were furnished by Logan business men, and the farmers brought the remainder. Cooking facilities were provided and meals were served in the College cafeteria at cost.

The daily program was as follows:

6:30 A. M.	All out
6:30 to 7:30 A. M.	Dress and Swim
7:00 to 8:00 A. M.	Breakfast
8:00 to 9:00 A. M.	Judging contests
8:30 to 10:15 A. M.	Demonstration and exhibits
10:15 to 12:00 A. M.	General Assembly
12:00 to 1.00 P. M.	Dinner
1:00 to 6:00 P. M. . . .	Field excursions, (Wed. and Thursday)
1:00 to 6:00 P. M. . . .	Depart. meetings (Wed. and Thurs.)
1:30 P. M.	General Assembly (Saturday)
3:00 P. M.	Baseball Game (Saturday)
6:00 to 7:30 P. M.	Swimming, Supper
7:30 to 8:30 P. M.	The Fun Hour
8:30 P. M.	General Assembly
10:00 P. M.	Dance (Wednesday)

Judging and other contests were participated in by most of the counties present. A large silver loving cup provided by the National Copper Bank was awarded to the county scoring highest. This trophy was carried off by Utah County.

The total registration of this Encampment was 285 women, 275 men, and 389 children, a total of 949 persons.

The Second Encompment was held July 26th to 29th, 1922. The Logan Chamber of Commerce furnished twelve large army tents for the use of the Encampment visitors, provided the Extension Service would duplicate the number. This provided 24 tents of 16 ft. dimensions. A large number of additional tents were loaned by the State Road Commission, and also quite a number by the National Guard, the Amalgamated Sugar Company, and residents of Cache County. The farmers also brought some tents. A total of 170 tents were fully occupied, and many of the visitors had to be quartered in rooms of the College buildings.

The following speakers were provided:

Henry Jackson Waters, Kansas City, Mo., Editor, Weekly Kansas City Star, former President, Kansas State Agricultural College.

Charles F. Curtiss, Ames, Iowa. Dean and Director, Division of Agriculture, Iowa State College.

Mary E. Keowan, Educational Demonstrator, American Washing Machine Manufacturing Ass'n. Author of "Laundry at Home." J.

Martha Jane Phillips, Educational Demonstrator, North American Dye Association.

Miss Bess M. Rowe, Field Editor of "The Farmer's Wife", a magazine for farm women. Published by Webb Pub. Co., St. Paul, Minn.

Charles R. Mabey, Governor of Utah.

Anthony W. Ivins, President, Utah Agricultural College Board of Trustees.

Elmer G. Peterson, President, Utah Agricultural College.

Play Hour Leaders: Dr. Fred Dixon, Miss Emma Howe, National Community Service Organization, Miss Erickson, and W. C. Bradford.

One session was attended by Governor Charles R. Mabey and his entire State staff, at which a very fine program was given.

The following was the daily program:

All out at chimes	6:30 A. M.
Breakfast	6:30 to 8:00 A. M.
Judging contests	8:00 to 9:45 A. M.
Department exhibits and demonstrations.	8:00 to 9:45 A. M.
General Assembly	10:00 to 11:45 A. M.
Dinner	11:45 to 1:45 P. M.
Demonstrations and exhibits	1:00 P. M.
Horse-Shoe Pitching contests	1:00 P. M.
General meeting	2:00 to 3:00 P. M.
Department meetings . . .	3:00 to 6:00 P. M. Thurs. and Fri.
Experiment Station Farm Excursions.....	
.....	2:00 to 5:00 and 4:00 to 6:00 P. M. Thursday
Field Trips	2:00 to 6:00 P. M. Friday
General Assembly	1:00 to 2:30 P. M. Saturday
Supper	5:00 to 7:00 P. M.
Baseball contests	5:00 to 6:30 P. M.
Play Hour	7:00 to 8:30 P. M.

Evening meetings	8:30 P. M. to 10:00 P. M.
Moving pictures for children	8:30 to 10:00 P. M.
Movies	10:00 P. M.
Dance	10:00 P. M.

The contest work was continued and somewhat enlarged, including a horse-shoe pitching tournament. The big silver trophy went to Weber County for the highest score in contest work.

The Utah Farmer furnished a silver cup for the horse-shoe pitching contest which was carried off by Weber County. Cache County won the baseball silver cup furnished by the Logan Hardware Company.

The registration at the Second Encampment was 675 women, 767 men, and 616 children, or a total of 2058.

Marketing

The work of marketing has been somewhat handicapped by the absence of a regular markets specialist. But, notwithstanding this condition, some very valuable assistance has been rendered in marketing work. The professor of marketing at the College, Dr. W. L. Wanlass, has made many trips out in the state to aid in this work, and has otherwise aided agents in organizing and conducting their work.

At the request of the county agents and farm bureaus the Extension Service issued a daily market news letter from July to December, 1922. This was compiled each morning by a special agent and mailed out in the afternoon to more than 200 agents, local markets committeemen, commission firms and others. The data was collected from local markets in Salt Lake City, Ogden, Provo and Brigham City, and from daily telegrams received from the principal markets of the country.

Near the close of the year a questionnaire was mailed to those who had received the news letter, and they were almost unanimous in their request for the continuance of the work another year.

COUNTY AGENT WORK

To the Director of the Extension Division:

Sir: I have the honor to submit herewith a report of county agent work in Utah for the past biennium.

Extent of Work

During the past biennium eighteen county agents have served the following twenty-one counties:

For full period of biennium:

Beaver County	Salt Lake County
Box Elder County	Sanpete County
Cache County	Sevier County
Carbon County	Summit County
Davis County	Tooele County
Iron County	Utah County
Morgan County	Wasatch County
Piute County	Weber County

For part of biennium:

Emery County, commencing July 1, 1921.
 Garfield County, commencing July 1, 1921.
 Juab County, commencing August 16, 1921.
 Millard County, ending June 30, 1921.
 Uintah County, ending August 15, 1921, commencing Sept. 1, 1922.

Sixteen counties have maintained county agents for the full period; two discontinued the work, one of which reinstated it again within a year; three new counties commenced the work. At present eighteen agents are serving twenty counties, a gain of two counties as compared with the close of the last biennium.

Organization

The county agents worked in co-operation with local farm bureau organizations in carrying out the extension program of work. Committeemen chosen conjointly by the farm bureau officers and the county agents were placed at the head of each project in every community. These project leaders assisted the agents in choosing cooperators to conduct demonstrations, in holding project meetings, in

following up the work during the season, and in collecting reports.

College specialists visited the counties upon request of the agents to give special assistance in their respective lines of work. The agents make such requests only when the demands of the people of their counties included service which the agents were not qualified to give. The county agent leader assisted the agents in developing efficient methods of work.

Program of Work

A program for extension work in Utah was outlined by the entire Extension staff in conference. The agents presented this suggestive program at meetings of the local and county farm bureaus. That part which interested the people was accepted and made to apply to their local conditions. Items of local interest not included in the state-wide program were added. For each project definite goals were fixed to be reached during the year. This co-operative program formed the basis for the work of the agent in each community of his county. The community programs were usually very much alike, therefore they were correlated into a county program through the county farm bureau organization.

Accomplishments

The following summary of work done in the state was not accomplished by the agents alone; they initiated practically all the work, followed it up, and compiled results but the cooperation of the farm bureau organization through its committeemen and of the College and other state and government specialists was necessary in actually getting the work done.

Soil Improvement

Drainage was promoted by assisting farmers in planning 215 systems comprising 52,407 acres. Most of these drainage systems were for individual farms or for small groups of farmers.

Irrigation work consisted largely of improving old irrigation systems by reorganization and introduction of more efficient methods of water distribution. A total of 18 systems comprising 33,459 acres were so assisted.

Fertility of the soil was increased by the introduction of rotation systems on 198 farms comprising 6,244 acres, and the plowing under of 1,007 acres of green manure.

Actual cash increases in farm returns due to the above work are difficult to estimate. Demonstrations comprising but a small part of the total work, which included check plots and permitted fairly accurate measurements of results showed increased returns of \$9,846.00.

Crop Improvement

Crop improvement work included seed selection, seed treatment, cultural methods, and introduction of new commercial crops. The following table shows the number of farmers assisted in one or more of the above phases of crop improvement and the number of acres included:

Crop	No. farmers assisted	No. acres involved
Corn	420	917
Wheat	1,573	22,773
Oats	192	1,151
Barley	23	122
Rye	18	161
Beans	8	55
Potatoes	1,661	4,592
Legumes and other hay.....	876	7,727
Fruit	1,720	12,769
Total	6,491	50,267

In the matter of securing improved seed 864 farmers were assisted in getting 13,496 bushels of grain and 870 in getting 17,925 bushels of potatoes. Much of this seed was certified or came from approved fields. Demonstrations in which pure Dicklow wheat was grown adjacent to other spring wheats commonly grown proved Dicklow to be superior. In Cache County it out-yielded other wheats by 10 bushels per acre, in Utah County by 13½ bushels, and in Sanpete County by 9½ bushels per acre. From an inspection of the best wheat fields in the state conducted through the Experiment Station 112 fields comprising 452 acres located in 13 counties were found worthy of official certification for seed purposes. Certified seed potatoes in Cache County produced an average of 26 sacks more per acre on 32 farms than common seed.

Growing of celery and head lettuce was introduced on a commercial basis among many new growers in five counties.

Assistance in rodent and insect control was given 7,342 farmers covering an area of 247,393 acres with estimated savings of \$223,552.00.

The resultant profit due to increase as shown by crop demonstrations, which again included but a part of the total work done on crops, was \$86,304.00.

Livestock

Livestock improvement has centered around increased use of pure bred sires, selection of females, better care, and disease control. Agents assisted farmers in securing the following:

Class of Stock	Registered Sires	Registered Females	High Grade Females
Horses	6	1	
Dairy Cattle	164	181	399
Beef Cattle	149	31	1,069
Sheep	101	45	
Hogs	56	136	

Dairy cows tested for production in three cow testing associations and by individuals numbered 1,976.

Farm buildings for housing livestock were constructed or remodeled on 333 farms.

Poultry practice was improved by culling, improved feeding, and housing on 861 farms.

Disease control included co-operation with the State and Government veterinarians in testing 41,901 dairy cows for tuberculosis, treatment of 10,311 head of young cattle for blackleg and vaccination of 2,185 hogs for cholera.

Livestock demonstrations on feeding, disease control, and culling increased returns by \$12,415.00.

Farm Management

Farm account books were distributed to 294 farmers upon their requests for such books. Cost of production records were given out to 521 farmers.

Marketing

Agents rendered assistance in marketing by supplying daily market information giving demonstrations on preparing farm products for market, and in organizing co-operative marketing associations. Twenty-two such associations were organized. Outside of co-operative associations, agents assisted 3,462 farmers in selling farm products and purchasing farm supplies with savings to the farmers of \$18,454.00.

Club Work

Boys' and Girls' clubs have been organized in every county. A total of 82 clubs on crops, livestock, home and garden projects, with a membership of 855 boys and girls, were organized of which 599 members completed their work with material profits.

Women's Work

Agents have cooperated with the women specialists of the College in introducing Extension work in clothing, foods, and health into all counties:

Statistical Summary

Farm visits	31,435
Office calls	23,376
No. demonstrations completed	2,523
Total meetings	6,523
Total attendance	156,620
Articles written for papers	3,062
No. community committee meetings	3,233
Days community committeemen worked	8,199

Boys' and Girls' Club Work

Boys' and Girls' Club work has been almost completely reorganized during the past biennium. The work in counties has been entirely shifted from county club agents to agricultural and home agents. The work was supervised in the state during the first year and a half by club leaders, but this responsibility has been shifted to the county agent and home agent leaders. This change has been an outgrowth of forced economy.

This change in leadership has naturally shifted the club activities from independent work into the regular program of the farm bureaus. The state specialists have

assumed more responsibility for the conduct of club work, and are making it a regular part of their projects.

A club leaders' training school was held each year at the beginning of the year's work. Each covered a period of one week and was attended by seventy-five leaders each year. Intensive training was given in the respective projects the leaders had charge of during the year. The girls' projects have been especially well done with a high rate of completion. The work, too, is being adapted more to the immediate needs of the boys and girls, and to those of the community.

The following table summarizes the work for the Biennium:

Club Work 1921-22			
Club	Organized Clubs	Enrollment	Members Reporting
Corn	14	49	24
Cantaloupe	1	4	1
Calf	5	41	4
Sweet Corn	1	2	2
Beets	11	42	9
Potato	9	35	31
Pig	31	193	117
Sow and Litter	3	8	5
Garden	12	64	24
Baby Beef	2	2	2
Sheep	8	20	7
Poultry	16	67	52
Stock Beets	4	4	4
Crops	11	68	40
Wheat Seed	2	6	1
Onion	1	7	7
Orchard	1	6	6
Milk Records	1	6	5
Live Stock	6	41	18
Health	7	69	47
Clothing	66	765	551
Food Preparation	6	50	38
Canning	18	288	218
Bread	16	276	175
Meal Preparation	7	55	29
Totals	228	1,866	1,176

WM. W. OWENS,
County Agent Leader.

LIVESTOCK

To the Director of the Extension Division:

Sir: I have the honor to submit herewith a report of Extension Livestock work in Utah for the past biennium.

The years just passed have been very important from a livestock standpoint, due to great changes brought about through readjustment. Conditions have changed rapidly, making for uneasiness among producers and causing mild speculation which in the main did not benefit producers but made it possible for speculators to take big profits. The unexpected rise in the price of lambs should have netted Utah feeders thousands of dollars but due to the scheme of marketing the money was made by the speculator and packer.

A year of advancing values has left the livestock industry of the state in much better condition than it was at this time last year. Sheep have recovered most and the sheep men are now in a fair way to making a recovery.

As near as we can figure the sheep and wool sold from the state brought about \$11,000,000 in 1922.

Beef cattle are recovering more slowly than sheep but prices during 1922 were uniformly higher than in 1921. The state probably receives near \$5,000,000 from this industry annually.

Hogs have vanished from our export business and Utah now imports large numbers of hogs to be slaughtered at local packing plants. A drive has been on all season to aid in this by increasing pork production.

The livestock work done by the Extension Division during the past year can be grouped under the following projects: Livestock improvement; hog production; feeding of livestock; range cattle management; range sheep management.

Livestock Improvement

During the period considerable work was done on the increase of pure bred bulls. Utah ranks high in the proportion of pure bred beef bulls owned and this work has been pushed. In one county 76 bulls were exchanged. In several counties committees were appointed to inspect the bulls offered for sale and poor quality bulls were not purchased. One hundred twelve pure bred beef bulls were placed in the state with the aid of Extension workers.

Work on improving the herds was stressed at meetings and judging demonstrations. Some work was done with horses as 10 pure-bred stallions were purchased with the aid of Extension workers.

Sheep men were aided in the selection of rams at the sale and 45 rams were purchased with aid of workers. An association of Rambouillet breeders was formed in Southern Utah and a great show held at Parowan. Extension workers aided in the work of forming the association.

Work in improving the hogs was pushed in nearly every county and 35 purebred boars and 71 sows were placed.

Hog Production

Hog work was done in seventeen counties during the year. Pasture demonstrations were conducted successfully in several counties. Several carloads of hogs were fattened for market under instructions from Extension workers. A carload of feeder hogs was marketed by county agent at a good price to the producer. A number of feeding demonstrations were conducted during the year and aided much in establishing improved methods.

The work with pig club boys brought out interesting facts in added gains on pigs fed properly by boys and more economical growth with pure breds.

All counties report an increase in interest in this project and most counties report an actual increase in hogs raised.

Feeding of Livestock

Meetings were held and the feeding of cattle and sheep urged. Visits were made to feed yards during the year and rations, methods of handling, and marketing were discussed. In most cases money was made by the feeders.

On September 9, 1921, at Panguitch one of the most important meetings of Utah livestock men took place. This meeting arranged by Extension workers brought the livestock feeders from the north into conference with the producers from the range country. A cooperative scheme of marketing livestock from the range through the feed lots to the packer was worked out, but due to financial conditions was not followed generally. The failure to follow the scheme lost hundreds of thousands of dollars to the state due to the unusual rise in prices of fat animals.

In 1922 progress was made in the effort to get the producer and feeder together on a co-operative plan of feeding.

Range Cattle Management

Several trips were made through the range country to talk over improved methods of handling cattle.

One of these trips covered 1,400 miles, 8 counties visited, 18 meetings held with nearly 600 livestock men in attendance. One of the features of this trip was that six of the big livestock feeders from Sevier County accompanied the livestock men and in this way became acquainted with the livestock producers of the range country.

Several demonstrations in methods of handling cattle are under way; in one, fall calves and spring calves are being run to see which will yield greatest profit.

Range Sheep Management

Work was done through the range country on range management of sheep. Meetings were held to discuss price of lambs and wool. By the work of Extension agents and the Utah Wool Growers thousands of dollars were saved Utah sheepmen, for advice as to prices of lambs and wool was sent out early so that growers had advance information. In one case at Cedar City wool started at 26 cents but by holding back men secured as high as 38 cents. More work of this type is planned for the future.

During the last two seasons the specialist was judge at the Ogden Livestock Show, Intermountain Livestock Show, Salt Lake, the Utah State Fair and ten county fairs.

Buying Cattle

In December, 1921, the specialist visited Wisconsin in company with a representative of the Sevier Farm Bureau and purchased a car load of pure bred and high grade Holstein and Jersey cattle. A Holstein bull secured on this trip and owned by a bull association in Sevier County was grand champion bull at the 1922 Utah State Fair.

In December, 1922, the Livestock Specialist aided in the selection of two car loads of pure bred and high grade Guernsey cattle for Weber County farmers. These cattle were purchased in Wisconsin.

Respectfully submitted,

JOHN T. CAINE III,

Livestock Specialist.

DAIRYING

To the Director of the Extension Division:

Sir: I have the honor to submit herewith a report of work in dairy extension in Utah for the past biennium.

The work of the Dairy Specialist in the Extension Division of the Utah Agricultural College has been accomplished largely in co-operation with the county agricultural agents. Our main projects have been for the improving of our herds through the use of better bulls, increased production through the selection and better care of cows, the improvement of our product through better equipment for milk production, and a better understanding of the scientific methods of manufacture.

During the two years now coming to a close, through the combined efforts of county agents and the Dairy Specialist, 104 pure bred bulls have been placed with new owners in the State of Utah. Some of these have gone into communities where no dairy bulls were previously owned. Many have been placed as community projects. A few have been placed in organized associations or companies, having for their aim general community benefit. One bull association has been organized upon the approved plan of the Department of Agriculture, copied after the bull association plans of Denmark. This Association is located and operating at Fairview, Sanpete County. They own four high class registered bulls and the plan has as one of its objects the changing of these animals from one locality to another within the community every two years, so that unless accident or death to some of the bulls should occur there will be no need of other investment for bulls by the members of this Association for a period of eight years. We need more of these associations.

The selection of cows through record keeping and testing of their products has received much attention. Many farmers have been induced to keep private records which is splendid as far as it goes but another Danish plan that has been adapted by the United States Department of Agriculture to American needs is the cow testing association plan for community cow testing. Through this plan a number of farmers become associated, each subscribing a given amount for each cow owned. This fund is used for the employment of a qualified man who will visit each farm once a month, weighing and taking samples of each cow's milk for a 24 hour period. He also observes methods of care and feeding. He tests the milk with approved apparatus, estimates the amount of feed each cow consumes dur-

ing 24 hours, takes the weighing and feeding for the 24 hour period he has observed as the average of what the cow has done for a 30 day period, beginning 15 days before and ending 15 days after his visit. The total results of 12 visits during the year gives a fairly accurate estimate of what the cow has done for the year. Through this procedure the cow owner is furnished with a close estimate of the production and its feed cost for a year. We have two of these cow testing associations organized in our state during the past two years. One is now in its second year and is operating in Utah County. The other organized during 1922 is operating at Richmond, Cache County. The benefits from this work are not confined to simply furnishing the farmer with a record of the production of his cattle but he receives advice from the tester as to care and handling of his cattle. This leads to better feeding, more attention to good water, greater regularity in feeding and milking, better shelter and more comfort which always results in more and better product which is a benefit to all concerned. In fact, the cow testing association is a real community benefit. It is an asset in any community where dairying is seriously considered. We need more cow testing associations.

One of the paragraphs that the Dairy Specialist has used in a charted or placard form and displayed at fairs and frequently upon the lecture platform is that, "We can increase the dairy output from the cows of Utah 20% without ever adding another cow to our herd. How? By giving better care to the cows we have." And, better care, including feeding, watering and shelter, is one of the projects we are working upon. Many demonstrations have been given showing the value of a light grain ration where none has been used before. Many yards are provided with water devices, bringing the water into reach of the cattle so that they may drink at will where formerly they were driven to water to some ditch or canal once or twice a day, and in the winter time then to get their drink through a hole in the ice. "A hole in the ice is a leak in the dairy."

Better shelter has been urged and in many cases this has led to its being provided for our dairy cattle. This does not mean expensive or high cost barns with expensive fittings but in some instances a good deep shed, for our slogan in regard to shelter is, "Shelter your cattle from wind and wet but never from sunlight and fresh air." Our aim is *comfort for the cattle*. Sometimes an expensive barn will not provide this and very often a well-roofed shed with a tight wall at the back may do so.

The fourth main project that has been receiving attention by the Dairy Specialist during the past two years is—better quality of dairy products and better quality of dairy products essentially begins with milk production, sometimes possibly a little earlier. Milk, to be good, must be clean milk. Good clean milk is required for the manufacture of good butter. Good whole milk is essential for the manufacture of good cheese. Good whole milk is essential for the production of a high class condensed or evaporated milk. So that insofar as the increase in the quality of products is concerned the chief attention has been aimed at clean milk. The consumption of dairy products is largely gauged by the quality of the products available and the best way in the world to improve the health of the people through an increased consumption of dairy products is to improve the quality of the products offered to the people. Improve the quality of milk, cream, butter, cheese and ice cream and increased consumption will inevitably follow. In fact, it cannot be prevented.

There are many miscellaneous matters that have received the attention of the Dairy Specialist, and while importance has been given to the major projects, it is not intended to exclude from attention any project or any matter that will, in any measure, develop the dairy industry in the State of Utah.

It is not the intention of the Dairy Specialist to give undue prominence to dairying alone but it is his desire and it is his aim to see dairying take its proper place in the agriculture of these mountain valleys. He does not wish to ignore the great importance of our range industries with their great herds of sheep and of stock cattle but he is ever mindful of the value of a good supply of dairy foods for the consumption of the people of this State, and he has endeavored to be consistent in this matter and has worked to the end that the people of Utah may be supplied with an abundance of these splendid foods without sending beyond the borders of the State for any portion of their supply. It is not commercial dairying, alone, that has received attention, for home dairying and the family milk cow have been the topics for many addresses in all parts of the State. There is no doubt in the mind of any thinking man that very often a better cow in the yard will mean cheaper milk, cream and butter on the table.

With these things in view the program of work has at the beginning of each year for some years back been outlined and submitted as a guide for the Dairy Specialist to follow and also as a guide to aid in co-operative effort

between the Dairy Specialist, the County Agents, the Farm Bureaus and various other organizations, and one of the outstanding accomplishments of the past two years has been the formulating of a program for five years work including the work accomplished during 1922. This program provides for a consistent following up each year of the work that has been launched in the year or years previously so that at the end of a five year period there will be through harmony and coordination the accomplishment of an amount of work that would never be possible through the following up of a series of disconnected and unrelated programs though each program for the year might be a good one.

The work of the Dairy Specialist during the past bien-nium has been indeed pleasant; the support he has received from all departments of the Agricultural College, friendly association with all members of the Extension Staff and the unstinted loyalty extended by the county agents, have all afforded him keenest satisfaction.

Partial Statistical Summary of Work Accomplished

Bull Association organized 1922, operating at Fairview, Sanpete County, on U. S. Dept. Agriculture Plan	1
Bull Association organized 1921, operating at Richfield, Sevier County, not on U. S. Dept. Agriculture Plan	1
Cow Testing Associations organized and operating, U. S. Dept. Agriculture Plan, one at Provo, Utah County, one at Richmond, Cache County.....	2
Plans given and assistance rendered for remodeling and improving barns	22
New Milk Houses	30
Milk Cooling Tanks	70
Pure-Bred Dairy Bulls placed through County Agents and Dairy Specialist	104
Fairs—Cattle and Farm Product Shows attended....	15
County and Community Fairs judged	4
Meetings and Assemblies addressed	213
Attendance at Meetings addressed.....	19,923
Farm and Home Calls, pertaining to Dairy Matters..	900
Letters written	570
Press Articles	30
Days and parts of days with county agents.....	157

Respectfully submitted,

BEN R. ELDREDGE,

Dairy Specialist.

POULTRY

To the Director of the Extension Division:

Sir: I have the honor to submit herewith a report of work in poultry extension in Utah for the past biennium.

During the past biennium the Poultry Specialist has been going out from the College on Extension work only on request of county agents when there was a particular need for this help. The problems of feeding, housing, culling, and caponizing have been the principal ones considered.

The work on feeding and housing has been done largely at specially arranged meetings, and by correspondence. On housing, about 400 blueprints of a semi-monitor house planned for Utah conditions, have been distributed and at least 200 new poultry houses of this type have been built and many old houses have been remodeled. Twenty-one meetings have been held with an attendance of 979 persons, and 54 farms have been visited. Six exhibits of different rations and eggs produced from them have been made at state and county fairs and at poultry shows. It is impossible to estimate fairly the number of people who received information on better feeding for eggs from these exhibits. The average production of the hens of the state, according to the 1920 census report is only about 80 eggs per year. This low production is due largely to inferior stock, poor housing, and inefficient feeding. Better feeding and housing should increase this low production by $\frac{1}{2}$ the difference between 80 eggs and 160 eggs, the amount produced by some of the better kept flocks of the state. The value of this increase at only 20c a dozen would mean an annual increase of \$668,286.00 to the poultry producers of Utah.

During this period 112 culling demonstrations at poultry yards have been given to show the poultry raisers how to cull out those hens which do not lay enough to pay for their feed. At these demonstrations there were 1,497 poultry raisers and over 16,000 hens were handled. Of this number 3,285 hens were culled out. If we assume that these culls would lay enough eggs to pay for $\frac{2}{3}$ of the cost of the feed they consumed, culling them out and selling them would mean a saving of feed amounting to at least \$1,640.00 a year to these 112 poultry raisers. If the same percentage of all other flocks of the state are culls and could be taken out by these culling methods it

would mean a saving of feed amounting to \$85,469.50 each year.

During this period about 5,000 bulletins and circulars on various phases of poultry raising have been sent out to those who have requested information of a general nature, and about 1,800 letters written in answer to questions on which no published information was available.

Respectfully submitted,

BYRON ALDER,

Poultry Specialist.

AGRONOMY

To the Director of the Extension Division:

Sir: I have the honor to submit herewith a report of work in agronomy extension in Utah for the past biennium.

The writer entered upon the duties of agronomy specialist on July 1, 1921. Before that date no particular attention had been given to agronomy lines of work aside from the general instructions and inspiration given to the county agents and the farmers by the Extension Director, State County Agent Leader, and Institute workers.

In July, 1921, nine major projects and four minor ones were outlined. The major projects are: 1. Better seed through hand selection. 2. Importing certified seed potatoes. 3. Wheat improvement. 4. Crop rotation. 5. Increasing soil fertility through green manuring. 6. Top dressing of pastures and alfalfa fields. 7. Deep plowing for root crops. 8. Value of commercial fertilizers in Utah. 9. Noxious weed eradication. The minor projects are: 1. The building of concrete manure pits. 2. Improving soil texture by use of land plaster and other chemical compounds. 3. The introduction of special crops. 4. Boys' and Girls' Clubs.

The projects have been developed and handled in the various counties as follows: The projects were first suggested by the county agents and then fully developed and outlined by the specialist, county agent leader and director. Copies of these outlines were then sent to the county agents for presentation to the farm bureau organizations of the counties with the understanding that these were the projects with which we were able to give help and that would lead in the direction of permanent development of the agriculture of the county. Each county and local organization then chose the projects which in their opinion were best suited to their needs. The projects were changed to fit the special needs of the particular county or community, and project leaders were appointed by the farm bureaus who in co-operation with the Extension staff have worked faithfully during the year.

The Co-Operative Agencies

The co-operative agencies in each project are the Extension Division and the farm bureau organizations of the state, county and community. The work is handled in the county by the county agents working through the

organizations of the farm bureau. In the state the work is done by working with the county agents and their project leaders by means of personal visits, meetings, and demonstrations.

The co-operators follow the instructions given to them by the county agent and the project leader in carrying the demonstration through to a successful conclusion. The project leader receives his instructions at the project leaders' school and from the county agent.

The county agent and state specialist meet and work out the details of the project together, so that there will be no disagreements and shifting of responsibility in the carrying out of the project. The state specialist also assists by personal visits to demonstration plots, by meetings and by written and printed instructions to carry the project to completion.

Project Leaders' Schools

Early in the year project leaders' schools were held in central places in the various counties at which local project leaders were present and were instructed in the most acceptable methods of making a success of their particular projects. We found this method very successful as far as fitting the project leaders for their job of helping their brother farmers in putting over the work successfully and at the same time it economized very materially on the time of the specialist.

Visits to Counties

At the convention of the State Extension staff held at the Agricultural College, the county agents and specialists made their schedule of the most profitable times for the specialists to visit their respective counties in order to be of the greatest service in helping to put over the projects. The agronomist has tried to live up to this schedule with such changes as were found necessary in order to avoid duplication of travel and of being in the county at the same time that other specialists were there.

Every county has been visited at least once and most of them a number of times during the year in the interest of the one project or another and help has been given county agents, who together with the specialist have visited and assisted all project leaders and co-oper-

ators both individually and collectively in making a success of their projects. It has been the aim of the agronomy specialist to visit each county as often as time will permit to check up on the work, to give advice, assistance and instruction as to the best method to employ in executing the work for best results, to give encouragement and to assist with demonstrations showing how best to put over the work.

Institute Work

Prior to July 1, 1921, the writer had charge of Farmers' Institute work so that during the biennium institute work has been done in every county.

Sometime during the experience of the writer he has had the privilege, opportunity and pleasure of visiting every community in the state not only to speak to the people but also to study agricultural conditions and home life as it has developed there.

County Fair Judging

During the biennium most of the counties where fairs have been held have been visited by the writer to judge the products of the soil there on exhibition.

Extension News

The writer is associated with Prof. F. R. Arnold in editing the Utah Extension News, which is an eight page publication issued monthly by the Extension Service to record the interests, activities and news of the Extension Service and those associated in co-operating with the same throughout the state.

Agricultural Correspondence Study

The writer has charge of the agricultural correspondence study work, such as outlining of the courses, reading and grading the papers as they come in and of writing out examination questions and reading the examination papers.

During the biennium there have been 245 students registered in correspondence work in agriculture, including agronomy, animal husbandry, veterinary science,

horticulture, floriculture, and poultry. The papers from all of these students have been read and graded by the writer and in the cases of agronomy and horticulture the courses have also been outlined by the writer.

In the free reading courses in agriculture all of the work has been outlined and read by the writer. This work takes on an average of about four days per month.

The Program of Work

SEED IMPROVEMENT. A great improvement in the quality of farm crops seed has been made during the biennium. The practice of head selection of wheat from the best plants and the hill selection of potatoes from the most productive hills has been begun with the result that for next year 49 farmers have 58 bushels of hand selected wheat for seed plots, and 238 farmers have 486 bushels of hill selected potatoes for seed plots for next year.

During the biennium 30,800 bushels of improved Dicklow and Turkey Red wheat have been produced for seed purposes. The average increase in yield of this improved seed over common seed was 13 bushels per acre.

During the biennium also 5,835 bushels of Improved Swedish Select oats have been produced for seed purposes. This improved seed has yielded on an average 19.1 bushels per acre more than common seed.

Potato production has made great progress during the biennium. The number of bushels grown from improved seed, either through hill selection or through importation of certified seed, amounts to 237,538. This improved seed yielded during the biennium on an average 96.5 bushels per acre more than ordinary seed.

CROP ROTATION. Interest is now being taken by quite a large number of farmers in most of the counties in crop rotation work. During the biennium 199 farms, comprising 6,693 acres, have been platted and are working on definite systems of rotation.

GREEN MANURING. During the biennium 1,025 acres of leguminous crops were plowed under to supplement barnyard manure in keeping up soil fertility, according to twenty demonstrations carried on in 1922. The plowing under of green manure (including alfalfa, sweet clover, or hairy vetch) increased the yield of potatoes on

an average of 185 bushels per acre. This would make an increase of 189,625 bushels for the state which at 25c per bushel would have a value of \$47,406.00.

TOP DRESSING OF PASTURES, ALFALFA FIELDS, AND HAY MEADOWS. Pastures are usually maintained on the poorest land available and as a result produce only a small quantity of good pasturage with an abundance of weeds and other poor quality plants. Splendid results have been secured by the application of manure to such pastures in the fall and then harrowing in the spring.

Fifteen such demonstrations were started a year ago with the result that during the present season the renovated pastures comprising 72 acres produced additional feed to the value of \$825.00.

Alfalfa fields also are greatly benefitted by the application of a thin coat of manure in the fall and harrowing in the spring. On 1,074 acres the increase in yield of the treated over the untreated was .66 tons per acre. Considering alfalfa hay worth \$8.00 per ton this would be an increase of \$5,670.72. This increase will not be for this year alone, but will produce an increase in yield for a number of years.

Permanent hay meadows, likewise are renovated by the application of manure as a top dressing followed by harrowing, while unmanured hay land yielded 1.7 tons per acre. During the biennium also a considerable acreage of wild hay meadow has been plowed up and either reseeded to tame or cultivated grasses or to other crops. The results of these demonstrations will not be available until later.

COMMERCIAL FERTILIZERS. This form of fertilization has been tried on a commercial scale for the first time during the biennium. The results, so far, show that only where intensive crops are grown is this form of fertilization economical and profitable.

ERADICATION OF NOXIOUS WEEDS. During the biennium 64,206 acres of cultivated land and 3,751 miles of roads, ditch banks and fence rows were cleaned of such noxious weeds as Wild Morning Glory, White Top, Canada thistle, and perennial sow thistle. If the value of eradication of these weeds is worth \$5.00 per acre and, \$5.00 per mile of roadway, etc., the value of the eradication of these weeds to the state is \$339,785.00.

CONCRETE MANURE PITS. In the present wasteful practices of handling barnyard manure thousands of tons of valuable manure are wasted annually. Eight demonstrations have been begun in Salt Lake and Weber counties in the construction of concrete manure pits for saving all of the manure both solid and liquid produced by the farm animals in the stables and corrals on the farms. This will cause the manure to retain its original fertility until it is spread onto the land where it is wanted.

SOIL TEXTURE WORK. In certain parts of the state a considerable acreage of soil has lost its texture. When water is applied it runs together so that when it dries out again it bakes and becomes hard and compact. Demonstrations are under way which will help very materially in correcting this evil.

SPECIAL CROPS. A number of demonstrations have been made and are still being conducted to determine the value of new crops as money crops, as green manuring crops, or as late fall and early spring pasturages. Such crops as head lettuce, celery, onions, dwarf essex rape, flax, winter emmer, hairy vetch, hubam clover, and varieties of silage corn have received attention.

CLUB WORK. Work with boys and girls is a very important phase of Extension work. To plant the right attitude in the hearts of young people for rural life is a very important piece of work.

Club work not only gives young people the right attitude but it also teaches them the best methods and practices for successful agricultural and home making work.

SUMMARY. During the biennium improved wheat made to produce 13 bushels per acre more than ordinary wheat thus increasing the yield of wheat 30,800 bushels.

Improved oats made to yield 19.1 bushels per acre more than ordinary seed, thus increasing the yield of oats 5,835 bushels.

Improved seed potatoes made to produce 96.5 bushels per acre more than ordinary seed, thus increasing the yield of potatoes by 223,713 bushels.

There are 199 farms comprising 6,673 acres under definite systems of rotation.

One thousand and twenty-five acres of leguminous crops have been plowed under increasing the resulting yields on the land to a value of \$47,406.00.

Pastures, alfalfa fields and hay meadows have been top dressed with manure to the sum of 1,171 acres.

Noxious weeds have been eradicated from 64,206 acres of cultivated land and 3,751 miles of roads, ditch banks and fence rows.

Concrete manure pits have demonstrated their economic worth.

Demonstrations on improving soil texture have been carried on with satisfactory results.

Special and leguminous crops for green manuring and pasturage have been introduced. Head lettuce, celery and onions have been proven to be of great value as commercial crops.

Respectfully submitted,

J. C. HOGENSON,

Agronomy Specialist.

ZOOLOGY AND ENTOMOLOGY

To the Director of the Extension Division:

Sir: I have the honor to submit herewith a report of the Department of Zoology and Entomology for the past biennium.

The work of this department has been limited to giving advice to county agents personally and by correspondence, and in making trips to various counties for talks, demonstrations, etc.

In this work several trips were made to Box Elder County to advise in the control of mosquitoes. Trips were made to Box Elder County to speak on fruit pests, to Morgan, Weber, Davis, Utah, Salt Lake, Box Elder, Summit and Carbon Counties to help county agricultural agents on pest control. In Carbon County the pest was the pine-leaf miner, a serious pest. In Weber County the control of sugar-beet web-worm was under discussion. In Utah County the question of dormant spray and the injury of tree-hoppers to young fruit trees were the questions considered. Several times these counties, as well as others mentioned, were visited in a survey. The department also made up and helped to look after an exhibit at the State Fair.

There are many problems in insect control that should be taken up with farmers; the control of fruit pests, in particular those of the peach and cherry. The question of dormant spraying of apples is becoming more important as certain pests are spreading in the state. The grass-hopper problem will probably need more attention this next year, and control campaigns should be organized by county agricultural agents with help from the College. There are also many emergency calls that should be made. At present the department cannot do justice to all of these without slighting teaching and research work. Some time a man should be added to the staff to give from one-half to full time to extension work as needed. This might be combined with plant pathological work, if a suitable man were found.

Another field that should be opened up sometime is that of Apiculture. The U. S. Department of Agriculture gives extension schools and helps to maintain men in the

different states in extension work in Apiculture. This industry is so important in Utah that it should receive aid from the U. S. Department of Agriculture in this line.

Respectfully submitted,
IRA M. HAWLEY,
Extension Entomologist.

PLANT PATHOLOGY

To the Director of the Extension Division:

Sir: I have the honor to submit herewith a report of work in plant pathology in the State of Utah for the past biennium.

Survey during the past years has demonstrated the fact that the State of Utah suffers heavy losses annually from plant diseases which attack her more important agricultural crops. In wheat for example, in 1920 this loss amounted to 404,000 bushels, for potatoes the same year, to 582,000 bushels. These losses are but indicative of the decreased yields which occur each year from the diseases attacking other important plant products of the state. Much of the loss could be prevented were the farmers of the state convinced of such losses and made better acquainted with these diseases and with definite methods for their control. With these facts in view the extension pathological services have been so projected as to provide the farmers and the various extension agencies with a more intimate appreciation of the natures and dangers of these various plant disease problems and further to acquaint them through demonstrations and otherwise with the most effective and most economic disease control measures.

Limitations of time and finance have made it necessary to limit pathological activities during the biennium. The work in plant pathology for the biennium has been done primarily during the year 1922. The work has been limited to the three divisions of the field as follows:

(A) Field meetings and demonstrations on the potato and other related diseases.

(B) A definite demonstration project of the methods used for the production of disease-free seed potatoes.

(C) The assembling and preserving of pathological exhibit herberia for the use of the agents in their respective counties.

Division A. Field Meetings and Demonstrations for the Biennium

Field demonstration meetings were held with the purpose of acquainting farmers and project leaders with the various potato diseases and their importance in the state.

The greater value of these meetings appears not so much in the number of farmers present as in their special contribution to the training of local project leaders and state workers in attendance: county agents, project leaders, and crop pest inspectors. The majority of these men were made acquainted for the first time with such diseases as mosaic and leaf roll and the disastrous effect of these upon the quality of potato seed. These demonstrations were conducted at the instance of the county agents and were so received by those in attendance as to indicate a further need of this particular type of work.

Meetings and demonstrations were held in the various counties and with results as follows:

Dates	County	No. Meetings and Fields Visited	Total Attendance	Remarks
July 3	Cache	4 Field meetings	40	Work on dates July 3 to 6 inclusive was concerned primarily with county agents, project leaders and crop pest inspectors.
5	Box Elder	5 Field meetings	15	
6	Davis	6 Field meetings	18	
7	Salt Lake	5 Farms visited	7	
8	Davis	12 Farms visited	6	
Aug. 18	Cache	10 Field meetings	150	Dr. G. R. K. Link of U. S. D. A. present.
19	Cache	1 Field meeting	6	
24	Box Elder	1 Field meeting	10	July 7 and 8 were spent on emergency work on tomato diseases.
25	Box Elder	6 Farms visited	5	
26	Davis	6 Farms visited	10	
28	Tooele	16 Field meetings	60	
29	Salt Lake	7 Field meetings	45	
30	Utah	1 Farm visited	5	
31	Wasatch	3 Field meetings and 6 Farms visited	49	
Sept. 1	Morgan	4 Farms visited	48	M. Shapovlov from U. S. D. A. present.
Totals:				
Counties worked.....			8	
Field Conferences.....			93	
Attendance			434	

Division B. County Agent Exhibit Work

Plant pathology in Utah is conspicuous for its lack of information now available to the farmers in the form of circulars and bulletins.

Western disease problems under irrigation are unique. Eastern conditions and problems are widely different from those of Utah, and much of the data on plant diseases obtained under Eastern conditions is inapplicable in the arid Inter-mountain West. In fact such information as may be applied lies so hidden in technical publication or in State and Federal bulletins and circulars, as to be unavailable to the Utah farmer and to the general reader. As a result the farming population is uninformed as to numerous crop diseases prevalent in the state.

At present the instruction of the farmer in plant pathology is accomplished through the personal contact of the county agents or specialists. This, it is evident, cannot be obtained even with a majority of the farmers of the state in any one season. Without the aid of other educational devices in the form of exhibits and adequate literature the personal contact method is inefficient and the results are seldom commensurate with the efforts put forth by such workers.

It may be stated unreservedly that at present our system for the dissemination of plant pathological information is wholly inadequate. On these problems the farmers of the state remain comparatively uninformed and the waste in the state to the amount of thousands of dollars, due to plant diseases, continues annually. Their problem from the extension point of view is essentially educational.

To meet this particular problem and as an aid to the county agents in their work, the assembling of suitable disease specimens showing various phases of Utah's plant diseases, was commenced in the spring of 1922. At present 31 of the most important crop diseases are advantageously displayed in preservatives and are ready to be placed at the disposal of the county agents. This work will be completed in 1923 and 1924 and will consist finally in a complete collection and display of the important diseases of the state as well as the most important of those plant diseases which may at any time be imported into our region. Among these latter diseases are included a number of the most destructive maladies of plants known to science.

The nature of this display permits of its use in a variety of ways: in the field, in public meetings, or as permanent office or public exhibits. A similar, if not identical, exhibit will be placed in a few of the rural high schools of the state.

Division C. Seed Potato Project

Utah grows approximately 15,000 acres of potatoes annually, with an annual yield of 2,500,000 to 3,300,000 bushels. The 5 year average annual yield for the State (1915 to 1920) amounts to 171 bushels per acre. The potato thus forms one of the important cash crops of the State and fits definitely and permanently into our crop rotation system. While the average acre yield in Utah is high as

compared with the average for the U. S. and also as compared with that of other states, yet it is evident from a comparison of the average yield of 171 bushels and the maximum yields of from 500 to 600 bushels frequently obtained, that we are not producing yields commensurate with the soil and climatic possibilities of the State. This discrepancy between actual average yield and possible average yield is largely a question of good seed. Seed varieties are not standardized in the State and the poor quality and degenerate conditions of our seed, due largely to disease, creates a serious problem resulting in heavy annual losses. Barring possibly the market situation, the perfecting of methods for the production of high quality disease-free seed is undoubtedly the most pressing need of the Utah potato industry. The chaotic condition of our seed potato industry is shown in the fact that Utah imports from distant points in Minnesota, Wisconsin, and closer from Montana, Wyoming, and Idaho a large proportion of the seed used annually for the production of her potato crop. The growers of Davis County for the 1922 crop imported 25 cars of seed from Minnesota at an actual cost of from \$25,000 to \$30,000. Approximately the same amount of seed was shipped into Weber and Salt Lake Counties from Minnesota and Wisconsin. In addition shipments were made for the potato growing counties of Weber, Morgan, Cache and probably Utah. It is conservatively estimated that at least 60 cars of seed were shipped in 1922 from Minnesota and Wisconsin. At the present freight rate from these points it is clearly evident that Utah pays annually as much as \$23,000.00 to the railroad companies for transportation charges alone. This estimated loss to the state does not take into consideration the shipments from the western states, previously mentioned, nor is there recognition given to the fact that much of this seed was obtained from unreliable sources and through irresponsible importers and was inferior to Utah grown seed, thereby producing a further source of loss.

The greater loss to the state does not result, however, from the money exported in exchange for seed. With seed equal to the best imported or to the best produced in Utah, it is estimated that the yield per acre would be increased at least 50 per cent. Assuming one half this possible increase, with good seed our potato production could be increased approximately one half million bushels annually. Were it desirable, from the view point of the market, to maintain production at its present total value it becomes evident that, with high quality seed, thousands of acres now grow-

ing potatoes could be converted to the growth of other crops.

There is no clear evidence that Utah is incapable of producing seed equal in quality to that of any other state. In fact, the evidence is quite the reverse. Our high valleys with unsurpassed soil and irrigation resources offer at least vast possibilities. Therefore, from the best evidence obtainable it appears that poor quality of seed potatoes results primarily from degeneration tendencies in the potato tuber itself. Recent developments in the science of plant pathology show rather clearly that certain phases of this apparent degeneration, and probably the greater part of such degeneration, is due to two specific diseases commonly designated as mosaic and leaf roll. These diseases are transmissible through the tube from generation to generation and are furthermore, rapidly transmitted from vine to vine in the field. Seed potato production is thus held by many workers to be primarily a pathological problem and it has become clearly evident that any system of seed production must include as one of its most important, if not the most important phase, methods for the elimination of disease.

As a result of the pressure for good seed and in view of present information in disease relations a definite demonstration project on seed potato production was outlined.

The ultimate goal sought in this project consists in the production of disease free seed potato and in the demonstration of such methods as are necessary in the production of first quality seed adequate to supply Utah's seed demands.

Results sought for the first year are as follows: first, to grow the best obtainable Minnesota seed for the first year under Utah conditions for comparison with first class imported seed the second year, 1923; second, to train project leaders, county agents and inspectors in the ability to recognize the various potato diseases and potato varieties, and in methods of disease eradication.

General Plan of the Project

The general plan consists first in securing the best seed obtainable and growing same as a check on climatic conditions in several areas in Utah favorable for seed potato production. Second, through processes of seed selection, seed treatment, roguing, and hill selection, to

prevent the accumulation of diseases and reduce as far as possible the disease in the seed as was originally present. Third, finally to test the seed so grown in as many localities as practical within the limits of the time and help available. Imported seed similar in quality to the original stock will be used annually as a check on the quality of the seed produced in the several areas. Exact details of the plan for each of the various counties may be epitomized as follows:

FIRST YEAR—1922

High quality (XXX) Minnesota seed to be planted in each of 6 counties: Cache, Box Elder, Morgan, Weber, Davis, and Salt Lake. Plats in each county will be rogued as follows: first roguing when plants are from 6 to 8 inches high, second roguing during early blossom period, and a third roguing after blossoming has ceased. A fourth visit will be made to the fields about September first to remove traces of Fusarium Wilt not detected during earlier visits. At harvest the best hills will be selected and saved as seed. Proper isolation and other precautions necessary for success will be given attention.

SECOND YEAR—1923

The seed grown in Utah during 1922 will be retained and planted in the same county in 1923, plats will be rogued and selections made as indicated under 1922. This seed will be checked against the best seed of the same variety obtained from Minnesota which in turn will be rogued and from which final selection will be made for comparisons in 1924.

THIRD YEAR—1924

Seed grown in Utah for the two years (1922-1923) will be checked in the same counties against seed grown in Utah for the one year 1923, as previously outlined. These two lots will again be checked against Minnesota first quality imported. The same methods will be employed as previously outlined for 1922 and 1923.

FOURTH AND FIFTH YEARS

The fourth and fifth years will consist of a repetition of the test with the seed grown in Utah 1 year, 2 years, 3 years, and 4 years, and against the selected imported seed.

An additional feature of the work not included in the outline will be the testing of the seed each year from the various counties in two general test plots in the lower valleys.

Various Agencies Contributing to the Project

Various agencies are contributing to the project as follows:

A. PROJECT LEADER—The farmer owning the farm on which the plot is located in each county will function as follows: provide land, prepare seed bed, plant seed, cultivate, irrigate and assist in harvest, all under the direction of the Specialist working through the county agent. Arrangements for such services are in all cases to be made by the county agent.

B. COUNTY AGENT

1. To obtain services of the project leader and arrange for suitable plots.

2. Through his farm bureau to provide adequate seed potatoes not provided by previous years growth.

3. To arrange for demonstrations and to aid when possible in roguing and selection work.

4. To supervise planting, irrigation, and cultivation of plots in his county and to co-operate with the Specialist on all matters relative to the plans and progress of the work.

C. THE SPECIALIST.

1. With the co-operation of the county agent, to direct and supervise all features relating to the project.

2. To arrange for purchase of seed potatoes.

3. To give personal attention to roguing work during the summer and selection at time of harvest.

4. To summarize results and to make such information available as is necessary for the continuance of the project and the promotion of the seed industry.

D. PATHOLOGICAL DEPARTMENT OF THE UTAH AGRICULTURAL COLLEGE.

The department will conduct greenhouse and field experiments on the various diseases functioning in the

degeneration of potato seed. These experiments at present will be confined very largely to the mosaic and leaf-roll. The progress and effectiveness of the demonstration work will depend very definitely upon the progress of this research.

It is estimated in order to demonstrate the possibilities and methods for the production of good seed, that these tests will be continued for a period of at least five years.

The work on this project has progressed in a satisfactory manner according to plans and the outlook is favorable for a continuance of the work in 1923.

Miscellaneous Emergency Work

Considerable time has been given to emergency disease work in the various counties. This special work has been the result of calls for assistance on the diseases of the various crops: tomato, strawberry, raspberry, celery, peach, and wheat. A number of apparently serious diseases have been observed which demand attention of research workers. This is especially true of the small fruits and the tomato crop.

In 1922, during the months of June, July, August, September, and October, 32 days were spent in the field either in field meetings and demonstrations on potato and tomato diseases or on the seed potato project. Time was distributed in the various counties as follows:

Cache	7 days
Box Elder	6 days
Davis	5 days
Weber	3 days
Salt Lake	5 days
Tooele	1 day
Utah	1 day
Wasatch	1 day
Morgan	4 days

Respectfully submitted,

B. L. RICHARDS,

Specialist in Plant Pathology.

LANDSCAPE GARDENING

To the Director of the Extension Division:

Sir: I have the honor to submit herewith a report of work in landscape gardening in Utah for the past biennium.

The work of the specialist in landscape gardening includes making of plans and specifications for the beautification of public and home grounds; giving demonstrations on the planting and care of lawns, shrubs, and trees; giving lectures on landscape work; publishing articles and bulletins on landscape work.

During the biennium the following number of places have completed work of beautification according to plans furnished and with the help of the specialist in planting:

Parks and other city improvements	37
School Grounds	16
Church grounds	27
Home grounds	62

Plans have been made and accepted for beautification of the following grounds in the spring of 1923:

Parks and other city improvements	16
School grounds	21
Church grounds	13
Cemeteries	3
Factories	2
Hospitals	2
Home grounds	5
Homes visited and given oral instructions on beautification	56

The development of landscape work in the state is altogether encouraging as an increasing interest in this line of work is manifesting itself.

This year's effort to assist with suggestions, plans, and specifications, as the case may be, has resulted in beautification of the following number:

City parks, community parks, and other city improvements	16
Church grounds	15
School grounds	21
Cemeteries	1
Factories	1
Farm and city homes	54

The above mentioned demonstrations were furnished plans and specifications and the work was carried out

under our direction. In addition to this, about one hundred homes in various communities were visited, which carried out our suggestions in arrangement and planting during the spring of 1922.

Change in Methods

As the calls for assistance have increased so much it has been decided to change our methods in doing this work, in order to be able to assist a larger number of homes. Instead of making plans for every home, we are now under the new system. We furnish all public places with plans and specifications, but the homes in the various communities which desire assistance are being visited and suggestions rendered there. Plans for the individual homes are no longer being made, unless we find conditions such that this will be necessary.

Under this new system we are able to assist a much larger number, and we expect to complete 100 public places and 500 homes during the coming year.

Under public grounds we are handling:

Parks and playgrounds.

School grounds.

Church grounds.

Cemeteries.

Auto camp grounds.

Factory grounds.

And other grounds which cannot be listed as home grounds.

Methods of Securing Demonstrations

Through county agents or home demonstrators, co-operation with various organizations is secured such as city officials, county officials, church organizations, Farm Bureau committees, school boards, clubs, etc. Demonstrations are decided upon and when assurance of financial support has been made, plans, specifications, and suggestions are submitted and work carried out.

Lectures

Whenever a county agent or home demonstrator finds a community interested in improvement of public or home

grounds, meetings have been arranged and lectures given. Those present who desire any assistance personally on their home grounds apply to the county agent or home demonstrator after meetings and when time permits such homes are visited and receive instructions and suggestions for beautifying.

Literature

A new bulletin on beautifying of the home grounds has been issued this summer, and a large number of mimeographed leaflets explaining various phases of the work pertaining to landscape gardening, in the different seasons have been distributed. Newspaper articles pertaining to beautifying have been issued in the various papers in the state. A large number of letters with questions pertaining to landscape work have been received and answered.

Transportation

During the spring and summer months we were able to communicate with our demonstrations by using the automobile which enabled us to do a much larger amount of work than if the train had been used. The rest of the year trains and stages were used.

CLASSIFICATION OF WORK FOR THE YEAR

During the months of November, December, January, and February meetings are arranged by county agents and lecturing takes place and new demonstrators are secured. During this period plans are made for public work.

During March, April, and May the entire time was occupied in assisting demonstrators in laying out the grounds and arranging groups of shrubs so that color and size are harmonizing, and demonstrating planting trees, etc.

During June, July, August, September, and October work was followed up and new demonstrators secured. Part of the time was used for making plans and specifications.

Respectfully submitted,

EMIL HANSEN,
Landscape Gardener.

CORRESPONDENCE STUDY

To the Director of the Extension Division:

Sir: The Correspondence-Study Department supervises all instruction given through correspondence and also that given by extension classes conducted by the resident faculty of the Institution or those especially employed by the President of the College to conduct classes to meet special conditions. The totals given below represent both phases of the work of the department.

We registered in 1920-1921, 642 students (358 men and 188 women); in 1921-22, 776 students (405 men and 371 women). The totals for the biennium are 1,418 students (763 men and 559 women). This shows an increase of 29 per cent over that of the total registration of the last biennium.

During the biennium instruction was given in the following departments. The figures give the registration in each department.

Departments	1920-21	1921-22
Accounting	89	65
Art	11	25
Agriculture	135	95
Bee Keeping	3	6
Domestic Arts	2	
English	152	193
Economics	40	37
Entomology	11	5
Education and Pedagogy.....		193
Finance and Banking	16	14
French	5	3
Geology	5	17
German	1	
History	100	75
Horticulture	19	21
Irrigation and Drainage	13	9
Latin	1	
Mathematics	37	35
Mechanical Drawing	2	2
Political Science	3	
Poultry	20	32
Reading Courses in Home Ec....	19	15
Sociology	55	49
Stenography and Typewriting....	18	14
Sanitation	6	17

School Hygiene	118	40
Salesmanship		2
Woodwork	3	2

Our students were registered from the following states and foreign countries:

Utah by counties	1920-21	1921-22
Beaver	5	19
Box Elder	29	102
Cache	111	142
Carbon	8	7
Davis	6	9
Duchesne	20	18
Emery	6	9
Garfield	14	13
Iron	10	14
Juab	13	14
Kane	9	18
Millard	15	5
Morgan	4	4
Piute		1
Rich	2	7
San Juan	9	3
Salt Lake	64	40
Sanpete	35	51
Sevier	15	6
Summit	9	8
Tooele	13	9
Weber	76	49
Wasatch	14	11
Washington	11	8
Uintah	11	17
Utah	43	60
Wayne	13	35
Colorado	13	21
Idaho	44	52
Maryland	1	1
Montana	1	2
New York		1
New Mexico	1	6
New Jersey	1	1
Nevada		2
Oregon	4	2
Ohio	1	1
Texas	1	1
Washington	1	3

Foreign Countries:

Canada	2	3
India	1	1
	<hr/> 642	<hr/> 776

Classifying our students as to vocations, there were:

	1920-21	1921-22
Farmers	108	119
Housewives	37	66
Teachers	253	345
Students	103	106
Accountants	37	28
Clerks	35	30
Laborers	5	11
Salesmen	4	6
Mechanics	3	15
Merchants	4	4
Stenographers		5
Agricultural Field Men	12	4
Soldiers	14	1
Attorneys	4	1
Unclassified	23	35
	<hr/> 642	<hr/> 776

Each year marks a decided increase in the efficiency of the work of the department, due to the real care of the readers of assignments in properly correcting and grading them, also in answering questions and assisting students over difficulties.

The number of students completing their courses is very gratifying and the high grade of work done speaks very well for the efficiency of this form of study.

There is a very insistent demand for courses in Home Economics, Household Administration, and Physiology, but these cannot be given with the teaching force now available.

During the biennium the following courses in Education have been prepared and offered for the first time: History of Education, Principles of Psychology, Methods of Teaching Agriculture, and "Scales and Measurements."

During the year 1921, successful extension classes were organized in Ogden, Brigham, Garland, Bicknell, and Logan; and in 1922 classes were conducted in Brigham, Bicknell, Ogden, Logan, and Richfield.

It is recommended that as soon as possible additional instructors be employed to organize correspondence study courses in such subjects as are called for by a large number of our citizens.

It is also recommended that provision be made during the next biennium to organize a larger number of extension classes in the communities of Northern Utah.

Respectfully submitted,

J. H. LINFORD,

Superintendent of Correspondence-Study.

IRRIGATION AND DRAINAGE

To the Director of the Extension Division:

Sir: I have the honor to submit herewith a report of Extension Work in Irrigation and Drainage in Utah for the past biennium.

History

Such extension work in irrigation and drainage as has been done during the period, January 1, 1919, to June 30, 1922 was conducted by the Department of Irrigation and Drainage of the Agricultural College. The policy followed was that of making special assignments for work as it came up with the result that no fixed program was followed. This method was found to be entirely unsatisfactory. Therefore, the present arrangement which had been discontinued in 1919 was resumed July 1, 1922. Previous to 1919, the same arrangement as at present had been in operation since 1913.

Present Organization

The work is now conducted under a cooperative agreement between the Extension Division, the Division of Agricultural Engineering of the United States Department of Agriculture, Bureau of Public Roads, and the Utah Experiment Station.

Nature of Utah's Irrigation Extension Problem

The situation in Utah as regards irrigation practice and irrigation organization requires that a definite program be laid out and followed in order that the irrigation resources of the State may be fully developed. This program must of necessity be centered on the problem requiring solution regardless of whether it leads into the field of research or of pure extension practice. As a matter of fact the nature of this problem is such that effective results can be obtained only by placing one organization in the field to bring about a solution of this problem and give that organization the liberty of extending into the field of investigations when necessary in order to obtain the information required in bringing about the solution of this problem. Land drainage will enter as a minor issue but must be included.

The most urgent need in agricultural development in this State is to "utilize to the fullest extent the natural irrigation resources of every community." This is impossible under present irrigation organizations in at least fifty per cent of the developed regions, because of the very nature of that development. Our irrigated lands have been developed by cooperative endeavor with the result that numerous mutual irrigation companies have acquired the water-rights of each stream. At present these companies covering the same or adjacent lands are in conflict one with the other to such an extent that the old plan of mutual development has been lost and overshadowed in the present struggle for water.

In addition, and of very great importance, is the fact that the primary rights are held by the canal companies covering the lower lands along the mountain streams. The high lands, which require the most water for proper crop production, receive the least. In most cases these higher lands have only a flood water-right. The return-flow from the proper irrigation of these higher lands in most cases will be sufficient for the lower lands. Where more is needed it can as a rule be obtained through the drainage of waterlogged areas, or through developing ground-water, or ponds in the lowlands which supply is now allowed to waste.

The proper utilization of these undeveloped sources of water on the lands where it is now improperly distributed means more to the farmers of Utah than all the reclamation of new lands which can ever be realized within the borders of the State. If the lands now included in projects can be properly irrigated and drained the crop returns will be increased by at least three hundred per cent, and the burden of taxation will be distributed in proportion. This goal is within the reach of Utah's farmers if they can be given the assistance required in bringing about the reorganization in irrigation practice which is necessary and essential to the solution of this problem.

The present program of work in irrigation extension in Utah, has this great goal in view, and is outlined with the idea of concentrating all efforts to the end that this may be accomplished.

Program for 1922

Previous to July of this year, the Irrigation and Drainage Specialist was engaged in co-operative work between the Government, the College, and the Experiment Station.

However, in view of the present definite arrangement which was to take effect July, he was relieved from part of his duties in the class room and thus was able to organize his work in the field early in the season. It was a simple matter to bring about the transition and outline a permanent program to be followed under the new co-operative arrangement. In fact the present organization is even better than it would be if the Specialist were responsible entirely to the Extension Service since the very meager individual appropriation would be barely sufficient to cover actual traveling expenses, whereas the additional funds available through the co-operation, while insufficient to do independent investigation or demonstration, are sufficient to enable the Specialist to conduct such studies as are necessary preliminary to launching the program of development in any community where work is undertaken, and to collect such records as are essential to the completion of any job undertaken.

In other words the program may now be speeded up to such an extent that results may be obtained years in advance of the best expectations under a policy of independent procedure. The entire program now in operation is based on the principle of co-operative endeavor, not only between the parties to the executive agreement but also with the communities or canal companies with whom work is undertaken. All the Specialist asks is that the present arrangement may continue and that the work may receive such financial support as the results obtained may justify.

Early in 1922, work was begun in six different communities for the purpose of laying a foundation to build upon in establishing such organizations as would result in conserving all the irrigation resources of these several partially irrigated districts. The experience of the past twelve years in similar work was drawn upon and indicated clearly that satisfactory results may be obtained only through concentrating on a few districts at a time rather than by scattering one's energy over the entire State.

As a result an effort has been made to do thoroughly the jobs undertaken and continue this program until all sections needing attention have been reached. Meantime certain work which was already under way under the old organization has been continued, and the urgent local irrigation and drainage problems which have arisen from time to time have been handled. In addition, preliminary observations have been made in other communities in order to direct attention to the important irrigation conservation

problem which needs solution, and to create the public interest which must go hand in hand with successful work.

Accomplishments During 1922

(1) Three separate canal systems serving the same or adjacent lands in Wasatch County were combined into one mutual system. The three classes of water stock were united and new stock issued all of one denomination with no preferential rights, but with a large surplus of treasury stock which is to be used for future development and expansion. This combination resulted in a more economical utilization of the waters already available to such an extent that the water users realized during the present season fifty per cent more than ever before. This was because of the fact that two of the old canals had an abundance of high water but a shortage of low water while the other company had but little early water but owned a reservoir where flood waters were stored for late use. The combination resulted in an equalization of distribution so that all users had sufficient for their needs at all seasons. In addition to this effective change, the stockholders under the new organization united in following an outline of development work prepared by the Specialist which resulted in enlargement of their present reservoir so that the storage capacity is increased one-third. This was accomplished since the close of the present irrigation season.

Surveys were made by the Specialist and his assistants covering six additional sites. The program of work outlined for this community includes constructing these reservoirs during the next two or three seasons. They can do this with their own labor without selling bonds or otherwise going in debt. They need not issue additional stock unless they choose to do so. This program also includes enlargement of the canal system and the installation of mechanical devices for distributing the water equitably among the users for the purpose of eliminating disputes.

(2) One entire river system in Iron County has been united into two in place of ten companies. These two companies represent the primary water-rights in the one case and the high-water rights in the other. The latter organization is so arranged as to eventually include the other company, when the proper time comes. This will be after a final adjudication is made by the State Engineer, and a few local objections have been removed.

Meantime development and expansion is steadily going on. When this reorganization work was begun in

1914 there were under irrigation on the entire stream only 4,000 acres. At present this area has been increased to 12,000 acres and the crop yields per acre are higher now than ever before. There is still room for expansion and plans are being worked out which if put into effect will add another 12,000 acres. These plans call for utilization of two and possibly three reservoir sites in storing water which is now wasted.

(3) Four communities in Sanpete County have taken the preliminary steps towards reorganizing their irrigation systems for greater efficiency. A fifty community has received considerable attention but local prejudice must be overcome before a cooperative arrangement can be effected. In the other four districts favorable progress has been made. Surveys covering canal systems, reservoirs and reservoir sites and drainage areas are completed and results are now being worked up which will form the basis of recommendation for future action. In every case conditions are favorable for at least doubling the efficiency of the present systems.

In one of these communities construction work is well along. A diversion weir or dam has been constructed for controlling flood waters and diverting low water out of the creek bed where it formerly lost 20.5 per cent, into a new canal which carries this water to the place of use with a loss of only 4.2 per cent, thus effecting a saving of 16.3 per cent over the old system. This weir and canal were constructed by the water-users without additional help at a cash outlay of only \$388 and a labor expense of \$1,238.

The structure was put to a severe test before it was entirely complete. The largest flood in forty years came over the new dam carrying rocks weighing several tons. The water was fairly thick with rocks, sand, gravel and mud. No material damage resulted from this severe test. On the other hand the method of construction is proved safe for any condition even the most extreme. At the same time the method is so cheap as to be within reach of any canal company.

(4) The irrigators under one stream system in Beaver County have incorporated where formerly they operated only under a gentleman's agreement. There are two main subdivisions in the lands under this stream. Each subdivision now has a single company in place of individual owners. These two organizations have united in constructing a new diversion works for controlling flood waters, gravel flow, and measuring and dividing the water.

Surveys under the direction of the Specialist were made which formed the basis of a report outlining a program of construction and improvement. Suggestions have been followed out in detail in constructing the diversion and measuring works. In addition one company is now constructing and has near completion a new canal which will carry their portion of the stream five miles to their lands, whereas formerly this water was carried in the natural channel, which resulted in much loss. Next season these losses and the saving resulting through the change of channel will be measured. A storage reservoir site was surveyed and report made.

(5) At Nephi, in Juab County, a piece of work has been undertaken which partakes of both extension and research. A strong line cannot be drawn between the two divisions and no effort has been made to do so.

Salt Creek discharges large quantities of gravel into the Nephi canals every spring and at flood season during the summer, when the canals are full, the streets and farms are flooded and water wasted. In cleaning the canals out the streets are filled with large mounds of gravel to such an extent that the city now raises a serious objection. In addition, the work of cleaning canals becomes very expensive. Last season four thousand dollars was expended by the Company in trying to keep the water in the canals.

In an attempt to work out a solution for this perplexing problems the canal company through the county agent sought the service of the irrigation Specialist. As a result the problem has been studied during the present season and a plan has been worked out for controlling the gravel flow. An assistant was placed on the job to supervise construction and to make a complete record of all phases of the construction and particularly to survey the storage basins where it is proposed to store the gravel, and by repeating the survey at any time it will be possible to determine the effectiveness of the work.

It is estimated that the present construction which is nearing completion will not exceed in cost the amount spent each season by the canal company in removing gravel from the canals, and that the works constructed will hold back the entire gravel flow for at least ten years. At a slight additional expense these same structures may be added to and provide storage for another long period of time. New structures may be built from time to time as needed. With respect to the efficiency of this work definite

statements cannot be made because there has been no precedent established so far as keeping records is concerned. As a result the work is experimental. If successful it will pave the way toward establishing similar structures in streams throughout the length and breadth of Utah, which work is needed more than any other one type of improvement. At present a large part of the flood waters in most streams are lost because of the gravel menace. If this can be removed the additional use of spring run-off in early irrigation may be made to produce double the amount of grains, hay and corn now grown under irrigation in Utah.

(6) At Santaquin, in Utah County, a similar piece of work to that described for Nephi is under way, and is being handled by the same assistant as at Nephi. Variations in details of construction are being made for the purpose of determining the most effective type of structure.

(7) At Mona, in Juab County, similar work is planned out as at Nephi and Santaquin. In addition a concrete water measuring and distributing structure has been completed.

(8) In Ashley Valley, Uintah County, cooperative work with the water-users under numerous independent canals and ditches, begun when the Specialist was County Agent in that territory in 1912, has developed steadily. For a period of four successive seasons detailed studies have been made of the problem to determine whether or not all the canals and ditches should, for efficiency, be incorporated into one system. Furthermore these studies include demonstrations showing the effect of following the rotation method of delivery in preference to continuous flow. One and two assistants have been maintained each crop season at the expense of the waterusers, to collect information and to conduct demonstrations. The result of the present season's work has not yet been reported.

(9) Ground-water development. The problem of ground-water development for the irrigation of arid lands where dry farming is uncertain, has been continued and carried forward, and a report covering this work is now in process of preparation.

(10) Testing pumping plant for efficiency. Work begun at Brigham City in 1921 has been completed, and will be reported in the publication on ground-water development.

Forty pumping plants, supplying orchards, small fruits, trucks, and other crops were given a complete efficiency test by measuring the input of electricity and the output of water, with notes on all intervening conditions. This test reveals the fact that many water-users may cut their power bills twenty-five to fifty per cent by effecting a few simple improvements or changes.

(11) Miscellaneous irrigation problems.

- (a) Use of fall and early spring water. In Utah, Davis, Morgan, Tooele, and Sanpete Counties early irrigation demonstrations were outlined after making borings under the snow in early spring and determining that the soil was dry a few inches below the surface and on down below the feeding zone of plants, except on wet lands or land which had been kept moist by continuous irrigation during the previous seasons.

Project leaders were selected in each county named, and work was organized in readiness for the usual spring weather. It happened, however, that the spring was very unusual. The snow melted slowly and was absorbed by soil which contained no frost. This was followed by numerous storms in such a way that most of the lands on which demonstrations were outlined were thoroughly moistened before flood season when the usual waste water is available, thus rendering early irrigation useless.

The exception to this was parts of Utah, Tooele, and Sanpete Counties. In Utah County, with one exception, the failure to carry the demonstrations through is chargeable to the canal company, the Strawberry Highline, which did not deliver water in time for early irrigation in the section where it was most needed.

At Santaquin, at Grantsville, and at Manti, in Utah, Tooele, and Sanpete Counties respectively, successful early irrigation demonstrations were conducted which resulted in an increased crop return vary-

ing between one hundred per cent for alfalfa and thirty per cent for wheat.

All the southern, western and eastern sections of Utah can use this practice with excellent results.

- (b) Installation of Measuring Devices. One canal system in Davis County installed a complete set of measuring and dividing gates during the present season following detailed suggestive plans furnished by the Specialist.
- (c) Reservoir Site Surveys. Surveys to determine the capacity of sites and the probable cost of dam were made as follows: Davis County 3, Wasatch County 7, Sanpete County 3, Iron County 2, and Beaver County 1.
- (d) Drainage. The majority of the drainage work in the State has been turned over to other Government workers. However, some attention has been devoted to the matter of rendering assistance where it was badly needed and where expert help was not available.

Five small tracts have been drained or partially drained as the case may be. In addition, county agents report rendering assistance in establishing and outlining systems on sixty-four different tracts including an area of 18,958 acres.

Summary and Conclusions

HISTORY OF IRRIGATION EXTENSION WORK IN UTAH. In 1913 a co-operative agreement between the Extension Service and the United States Department of Agriculture resulted in placing a specialist in this field. Later on in the same year the Experiment Station was made a party to this arrangement. Since that time the work has been conducted continuously by the same specialist except during the period July, 1919, to June, 1922, when the Department of Irrigation and Drainage was given charge of the work, and different members of the staff were assigned to special tasks as they developed. Results show that this

arrangement is not satisfactory but that it is far better to give one individual the entire responsibility rather than scatter it over an entire department.

PRESENT ORGANIZATION. The present organization consists of a co-operation between the Extension Service and Experiment Station of the Agricultural College with the Division of Agricultural Engineering, Bureau of Public Roads, United States Department of Agriculture. This form of co-operation is most desirable for the reason that the very limited funds contributed by each party to the co-operation when concentrated on one problem makes a fund sufficient to enable the irrigation engineer in charge to get results which really count in the development of the state in which he operates. During the past three years these funds have been scattered in such a manner that there is less to show for the efforts expended than is in evidence at the close of the first season after bringing these co-operating agencies together again. The conclusion is self-evident.

UTAH'S IRRIGATION PROBLEM. The greatest need in Utah along the line of public service in irrigation is to map out and follow a definite program which will result in bringing about a more efficient use of the water supply already available to irrigators without the use of extensive and expensive storage works.

Much of the present water supply is misappropriated or not used at all. By developing the proper co-operation between canal companies in adjacent territory these unused waters or the improperly distributed water supply, or the high waters which run to waste may be brought into use thus providing a full water right for lands which are only poorly irrigated at the present time. In this way the crop producing power of the lands already in projects may be increased at least three hundred per cent and the burden of taxation distributed in proportion. This will also provide a relative number of homes for Utah's sons who are now seeking locations in outside states.

PROGRAM FOR 1922. Work was organized early in the year 1922 along rather definite lines, even the present organization was only contemplated. Principal efforts centered on the problem of obtaining greater efficiency in irrigation systems already in operation rather than to aid in creating new irrigation enterprises. In addition efforts were made to make use of early irrigation water and demonstrate the effect of this practice in crop production.

This program has been carried through the year with very satisfactory results and forms the basis for establishing a permanent program in irrigation.

Incidental requests throughout the state for assistance in irrigation and drainage were handled as far as possible without interfering too much with the regular work.

ACCOMPLISHMENTS DURING 1922. (1) One section formerly covered by three separate irrigation systems has formed a mutual organization and now operates as a single unit with only one class of water stock, with the result that an increased effective use of fifty per cent has been realized. In addition the reservoir which holds back water for late use has been **enlarged one third**, and six additional sites have been mapped out for development. Surplus treasury stock will be issued for the improvement whenever the stockholders desire this to be done. This will throw the burden of development and expansion on those who desire additional water stock for new settlers, rather than upon those who feel that their water supply is already sufficient.

(2) One stream system which formerly had eleven classes of water-rights has been united into two organizations, one covering primary rights and one covering all highwater rights which are now included in one class. Progress has been made in the direction of ultimately including all under one mutual company.

Under this system a gradual regeneration has been in process since 1914. During that time the irrigated area has expanded three hundred per cent. Plans are now under way which will result in providing water for twice the present irrigated area which means an increase of six hundred per cent as a direct result of the public service rendered this district.

(3) Four additional communities have undertaken the task of working out a more efficient system of handling their water supply. Surveys have been made by the Specialist and his aids, covering the lands involved, also the watershed, and the results are being studied to determine what course to pursue in bringing about the efficiency in organization and operation which is desired.

A fifth community has considered this question but is not ready to act until more work is done among those who are still skeptical.

(4) Another stream system serving two sections of territory has organized into two companies and these have

united in building a diversion works and system of measuring devices for controlling and dividing the waters of the stream. One of these companies has constructed a new canal five miles long to eliminate loss by seepage in the old natural channel where the water formerly ran.

(5, 6 and 7) Studies are being made concerning the control of gravel flow in three different stream systems. Plans have been worked out which contemplate preventing any gravel or sand from entering the canals after these plans are put into effect. The waterusers under one of these systems, by their own efforts have completed the control works as designed and work is in progress on the others.

In addition, one of these companies has built a concrete and steel weir and divider for regulating the water flow after the gravel menace has been removed.

It is estimated that the system of operation now being installed will reduce maintenance costs to only ten per cent of what it has formerly been.

(8) In one valley which draws water through numerous large and small canals and ditches and delivers that water by the continuous flow method, studies were begun in 1912 to determine how the enormous waste of water resulting from this erroneous method of delivery might best be eliminated and the most efficient system of operation substituted. This work was intensified in 1919 and has been carried on co-operatively with the several canal companies ever since. Final conclusions have not yet been made. However, the practices have been modified to a considerable extent with the result that much of the waste of water at low-water time has been eliminated.

(9) No new work has been undertaken relative to ground-water development. However, the work under way has been amplified preliminary to publishing a report of the studies and demonstrations which have been in process since 1914.

(10) Efficiency tests of forty pumping plants in the vicinity of Brigham City begun in 1921 were continued. The results are not all calculated but thus far show that a material reduction in power consumption may be effected by making a few simple changes in the details of some of the plants tested.

(11) Miscellaneous Irrigation and Drainage Problems.

- (a) Demonstrations in the use of early water were outlined in five counties. Most of these did not carry through due to unusual weather conditions in northern Utah, and due to failure of one canal system to deliver water soon enough to lands which were dry and really needed the early water. Results of the few demonstrations completed show a remarkable increase in yield as a result of early irrigation compared with the ordinary method.
- (b) One system installed a complete set of measuring and dividing gates following suggestive plans furnished by the Specialist, after making a study of the requirements.
- (c) Surveys were made covering sixteen small reservoir sites varying in capacity between ten acre-feet and twenty-eight thousand acre-feet. These sites cover lands included in one or more of the districts where studies are being made looking to the final economic utilization of all available water supply which may be used by the settler already on the land, their sons, and any who may wish to join hands with the mutual organizations established for bringing about a maximum development of these resources.
- (d) Assistance was rendered in establishing five small drainage systems in various parts of the state. In addition county agents report lending assistance in providing drainage for sixty-four tracts including an area of 18,958 acres, during the present season.

Respectfully submitted,

L. M. WINSOR,

Specialist in Irrigation and Drainage.

HOME DEMONSTRATION WORK

To the Director of the Extension Division:

Sir: The past biennium has brought about new aspects and new possibilities in the development of Home Demonstration work in the State of Utah. Significant points in progress during this time are:

1. UNIFICATION OF EXTENSION SERVICE PROGRAM OF Work. Agriculture, Home Economics, and Boys' and Girls' Club Work are being closely correlated, each supplementing and reinforcing the other. A five year program is in process of construction which emphasizes unity, correlation, and co-operation in all work.

2. UNITY OF SUPERVISION. State Extension Staff members are interesting themselves in all phases of Extension Service work and aiding in stimulating interest and in securing results in all projects. The agricultural leaders, specialists, and agents have taken unusual interest in encouraging Home Demonstration work throughout the State.

3. EXTENSION OF PROJECT WORK. Home Demonstration project work has been extended from nine to eighteen counties without home demonstration agents in the counties. The county agricultural agents are actively aiding the work by assisting in organization of project groups and in collecting and compiling data of work done.

4. VOLUNTARY PROJECT LEADERSHIP AND TRAINING OF PROJECT LEADERS. Voluntary leadership among the groups of women doing project work has made it possible to extend Home Demonstration work much more rapidly than would be possible otherwise. The project leaders from various communities meet in a central place in the county, and the Home Demonstration Specialist assisted by the Home Demonstration agent present subject-matter and methods to them and drill them in the technique of the work to be done. The leaders in turn teach their groups, assisted if necessary by Home Demonstration agents. This conserves the Specialist's time and makes it possible for her to cover a larger territory. The agent can work more rapidly in her rounds of visits to the communities to supervise the group activities.

Various phases of Clothing, Home Health and Nursing, and Foods can be carried on very nicely in this way.

5. **ADDITIONAL SUPERVISION THROUGH DISTRICT AGENTS.** Four home demonstration district agents have been added to the Home Demonstration staff this year. Each district agent has supervision of Home Demonstration project work in a district comprising four counties each. The district agent does follow-up work in projects initiated by the State Specialists by assisting project leaders carry on work with their project groups, supervising individual demonstrators with their special work, and assisting individual project members when necessary. She also stimulates interest in additional phases of work some of which she may initiate into project form herself, or secure additional services of the Specialist if necessary. The work of the district agent offers the best possibilities for training home demonstration agents in extension methods before they are assigned the full responsibility of county Home Demonstration agent.

6. **MAINTAINING EXTENSION SERVICE IDENTITY.** In the past when Extension Service work has been carried on with a co-operating agency the co-operation often became absorption by the other agency. A type of work in Home Demonstration is being developed which is distinctive in plan, method, and requirements and can be carried on with any agency or organization without losing identity. Experience teaches that identity is a valuable asset in accrediting and measuring work done.

Co-operating Agencies

A large part of the Home Demonstration project work has been carried on through the county and community Farm Bureaus. Splendid work is done by women as leaders of Extension Service projects and they work loyally under the direction of Extension Service workers. Other co-operating agencies are: Relief Society Associations, Mutual Improvement Associations, Parent Teachers Associations, Public Schools, Public Health Associations.

The Co-operating Demonstrator

Some phases of Home Demonstration work do not lend themselves to group instruction but are admirably suited to individual work by way of experimentation or demonstration carried on in the home. The person undertaking a home demonstration agrees to try out certain

methods or activities, under the direction of the Extension worker. These methods are designed to show that such practices are feasible and practical. Individuals carrying on home demonstrations are called "Co-operating demonstrators." Directions for conduct of the work is furnished by the Extension worker with record forms for tabulation of results. Successful demonstrations are given publicity as "exhibits" and the data secured used as additional information for project work. Representative types of such work are: Remodeling of Kitchens for Convenience and Efficiency; House construction, building and furnishing; Landscape gardening and beautification of surroundings.

Home Demonstration in State Extension Service

PURPOSE: To awaken further interest in the necessity for both men and women to recognize the essential needs of the homes of to-day and to realize the ability and training to meet these needs. To secure active participation in carrying out definite practices for the betterment of homes and communities.

Outstanding instructional needs:

1. Better health standards for the family with the positive rather than negative viewpoint.
2. Positive practices in the physical care and development of each member of the family through:
 - a. Housing conditions and home conveniences.
 - b. Personal hygiene.
 - c. Sanitation in homes and in communities.
 - d. Food selection and food habits in relation to human health.
 - e. Clothing in relation to health and economy in the home.
 - f. Proper expenditure of income in building family efficiency.
3. Positive mental and moral attitudes and practices are wholesome in their influence for:
 - a. Better understanding of child life in relation to its psychic and ethic needs.
 - b. Team-work practices on the part of parents in maintaining wholesome home control.

- c. Securing home environments conducive to contentment and happiness of entire family.
- d. Appreciation and expression in the world of ideals through literature, art, music, etc., and active service in constructive problems of the home, community, and other organized groups.

Responsibilities of Extension Service of Utah Agricultural College in Meeting the Instructional Needs of the Homes of the State

"The main function of the Agricultural College is, directly or indirectly, to train farmers and housekeepers; * * * to train housekeepers in the tremendously delicate and important tasks of household management and of child rearing; * * * to carry available dependable knowledge into the homes; to search constantly for new truths, and to aid the home in its application of these truths in furtherance of greater happiness and success in home life."

Under legislative enactment, both State and Federal, the Extension Service is enjoined to disseminate information in Agriculture and in Home Economics that shall be directly helpful to farmers and to housekeepers throughout the state.

Difficulties in Meeting Responsibilities

1. LIMITED SERVICE—The limited number of Home Demonstration workers in the State Extension Service makes it impossible to reach more than a small fraction of the home populace in the state.

2. INADEQUATE FUNDS—The general interest in Home Demonstration work is wider and the insistent demands for this type of public instruction greater than ever before, but the inadequacy of funds makes it impossible to advance the work to meet the demands.

3. DEARTH OF RESEARCH WORK—Experiment Stations in connection with Agricultural Colleges generally have conducted much research work contributing to Agricultural problems, but have made very little effort to secure enlightening information directly applicable to home problems. There is great need of investigations and research

work both practical and technical that will give the same dependable information and standards in home economics that is being so rapidly acquired in agriculture.

4. COLLEGE DEPARTMENTAL SUPPORT—Extension Service agricultural work receives the active support of the School of Agriculture of the College. Members of the teaching and of the research force frequently aid in extension agricultural work, by way of lectures or demonstrations, or by sitting in at committee councils; or advising on project subject-matter, etc. The Home Demonstration work receives practically no aid from the interior departments. When departments or individuals have been appealed to even for small assistance it is discovered that the teaching load of the departments is too heavy to permit any individual to take on additional work.

5. INADEQUACY OF HOME ECONOMICS TRAINING FOR EXTENSION FIELD WORK—As Home Demonstration work develops it is becoming more and more evident that the Home Demonstration worker must be equipped with broad training and practical experience. The home problems are numerous and varied, and must be met in discussions with experienced housewives. Because the average Home Economics graduate is unable to meet the requirements of practical field work in Home Demonstration it is very difficult to fill Home Demonstration positions when vacancies occur.

Provision for additional training and field experience should be made by co-operative effort of the interior departments and the Extension Service in order to insure availability of qualified women for Home Demonstration positions.

During the year 1921 Home Demonstration work was carried on in the State by the following number of workers:

- 4 County Home Demonstration Agents, full time.
- 1 County Home Demonstration Agent, part time.
- 1 Urban Agent, part time.
- 1 State Home Demonstration Leader, full time.
- 1 Clothing Specialist, full time.
- 1 Home Health Specialist, part time.

9 Total

During the year 1922 the number of workers was:

- 4 County Home Demonstration Agents, full time.
- 1 State Home Demonstration Leader, full time.
- 1 Clothing Specialist, full time.
- 1 Home Health Specialist, full time
- 1 District Home Agent, full time.
- 3 District Home Agents, July 1 to January 1.

11 Total

The projects carried on in Home Demonstration work during the biennium were:

Major Projects

- 1. Clothing.
- 2. Home Health.
- 3. Sanitation.
- 4. Nutrition.
- 5. Beautification of Home Grounds.

Minor Projects

- 1. Food Preservation.
- 2. Food Preparation.
- 3. Home Management.
- 4. Interior House Decoration.
- 5. Community Rest Rooms.
- 6. Community Play Grounds.
- 7. Community Water Systems.
- 8. Project Exhibits and County Fairs.

Clothing Project

The clothing work has received major attention for the following reasons:

- 1. Concentrated, uninterrupted supervision has been given the work by a full time specialist for the last three years. This has made it possible to work out progressive plans and methods and so systematize the work that the maximum results could be attained.
- 2. A large part of the organization work needed in carrying out Extension Service programs was done through the evident interest on the part of women in clothing. Thus the clothing project contributed to organization methods which are also adaptable to other types of projects, and served to teach leadership of groups and responsibilities of group members in project work.

3. The Clothing work was found to be a pressing economic need as it plays a large part in the economy of the home particularly when the cost of ready-made clothing is so high and the farm income so low. The following is a statistical report of Clothing work done during the past two years:

Full Time Specialist Supervising—1921

Number counties in which work was done	12
Number communities in which work was done . .	113
Number lecture-demonstrations held	328
Total attendance	6,231
Training classes for Local Leaders	136
Attendance at training classes	242
Number project leaders secured	246
Number project members	3,196
Number activities reported completed	8,578
Number homes visited	370
Total savings reported	\$20,864.58

Full Time Specialist Supervising—1922

Number counties in which work was done	17
Number communities in which work was done . .	155
Number lecture-demonstrations held	448
Total attendance	7,747
Training classes for Local Leaders	282
Attendance at training classes	1,428
Number project leaders secured	840
Number project members	5,789
Number meetings held by project leaders	837
Total attendance at meetings	8,617
Activities reported completed	10,021
Total savings reported	\$20,728.30

Health Project

The Extension health program comes legitimately within the field of Home Economics work and correlates closely and vital with all other problems recognized as the prerogatives of Home Economics instruction.

There is no one outstanding need of the homes of to-day more important than the recognition and appreciation of family health vividly enough to carry over into actual practice the definite things that will build and maintain the health of the individual.

With this objective in mind the Extension Service Home Health program is planned to include the following:

1. Training in recognition of health standards for each individual member of the family according to age and sex, with the positive health viewpoint rather than negative, visualized definitely by score-card measurements which are used progressively as the individual develops. Records to be kept as index of family health history.

2. Outline of necessary factors included in the physical care and development of the family in order to attain the highest health measurements.

- a. Housing conditions and conveniences conducive to health.
- b. Personal hygiene practices.
- c. Home and community practices in prevention of illness.
- d. Food selection and food habits in relation to health.
- e. Clothing in relation to health.
- f. Sanitation in homes and communities.
- g. Proper expenditure of income in providing for family efficiency.
- h. Mental and moral attitudes and practices that are positive influences for better health practices in homes and communities.
- i. Team-work practices on the part of parents in maintaining a wholesome home control.

Active support of and contribution to the Home Health program is given by the working divisions of the State Extension Service as follows:

1. Administrative committees of State Extension Service.
2. Home Demonstration Agents.
3. Home Demonstration Specialists.
4. County Agricultural Agents.

Splendid co-operation is maintained with Home Health project groups throughout the State through project leaders, project members, co-operating demonstrators, and co-operating agencies. A part time Home Health Specialist was employed during the year 1921. In 1922 a full time Health Specialist was employed. The Specialist works in co-operation with other Extension Staff members in determining the needs of the Home Demonstration programs in outlining subject-matter and methods used in the home programs of work, and in supervising the health work as carried out in the field practices.

A statistical report of work done during 1921-1922 follows:

Number counties where work was done.....	18
Number communities where work was done	139
Number lecture demonstrations given.....	607
Total attendance at lectures.....	27,520
Number project leaders training classes held.....	52
Total attendance at leaders training classes.....	1,015
Number project leaders giving active service.....	504
Meetings held by project leaders.....	127
Total attendance at project leaders meetings.....	1,923
Total number project members	2,997
Number activities reported established as a result of project information and demonstrations.....	1,592

Sanitation Project

The work in Home Sanitation was carried on in co-operation with the Home and Community Section of the State Farm Bureau. A special committee was appointed by the State Bureau to work in connection with the Extension Service and other State agencies and with the county and local Farm Bureaus for "A Cleaner Utah."

8 counties participated in the work.

14,537 reports were received specifying work done which included, clean-up of home and public grounds; screening of homes; installing sanitary privies; removal and treatment of manure; repairing fences and out-buildings; repainting; planting lawns, trees and shrubbery.

This project is to be made part of a co-operative program to be carried on by interested agencies each year.

Detailed statistics are available in each of the projects but the above will suffice for illustration of methods and results. Activities actually established in the homes as

home practices is the ultimate aim of the Home Demonstration work. The Extension Service does not consider number of general lectures given and large numbers of persons met as evidence of measurable values in work. The most satisfactory evidence of real accomplishment consists of the number of new practices actually adopted with success and benefit to the home.

A statistical summary of all project work done during the two years is as follows:

State Summary of Home Demonstration Project Results

Number of counties in which work was done	1921 12	1922 18	Total 30
Number of communities in which work was done	113	155	268
Number lecture-demonstrations given by Extension workers..	1,125	872	1,997
Total attendance at lectures.....	32,095	24,126	56,221
Number project leaders training classes held	186	344	530
Number of project leaders.....	504	1,368	1,872
Number of project members.....	4,689	9,015	13,704
Number of project meetings conducted by project leaders....		901	901
Total attendance at meetings.....		9,963	9,963
Total home practices established as result of Home Dem. work	14,342	15,029	29,371
Number visits in homes concerning project work	673	570	1,243
Conservatively estimated savings reported by home women as a result of practices established	\$22,247.82	\$21,118.93	\$43,366.75

Respectfully submitted,

RENA B. MAYCOCK,

State Home Demonstration Leader.

CLOTHING PROJECTS ESTABLISHED

The following projects have been principal clothing problems during the past two years; Dress Construction, including elementary and advanced dress making, Dress Forms, Millinery, Renovation, including Cleaning and Pressing, Tailored Finishings, Remodeling and Children's Clothing.

Organization

1. Organizations entering into the Clothing activities for this year have been either Relief Society, Boys' and Girls' Clubs, Women's Section of the Farm Bureau or Institutional.

2. These organizations have qualified for Extension service through willingness to fulfill definite requirements outlined in Clothing programs of work, and have taken responsibility of establishing demonstrations and compiling measureable results.

3. All County or Community work has been effected through plans and recommendations offered by the County Agricultural Agent, the Home Demonstration Agent or State Clothing Specialist.

4. DEMONSTRATIONS REQUESTED—Outlines of possibilities in Domestic Art, together with project plans were furnished by the Clothing Specialist and presented to the organizations to cover the immediate community needs and were sent through the county agent to the state office, the same being acted upon, and appointment made for the assistance of specialists or other available help. Detailed instructions were sent to the county agent to be passed to county or community officers for further action of projects.

5. SELECTION OF PROJECT LEADERS—One of the most important steps in the organization of project work is the selection of capable leaders. It has been experienced that the best seamstresses do not always make the best instructors neither do they always take responsibility necessary for successful results. Hence careful efforts have been expended in selecting leaders who could qualify for these positions. The county agent, committee members and any others who have had to deal with the selection of leaders have adopted the practice of scoring the nominees

as to success in the presentation of subject matter, willingness to give public service, ability to create enthusiasm and to be able to offer assistance without remuneration. During the past year these qualifications have been set as ideals in the selection of leaders; as a result, the personnel and efficiency of the project leader's staff throughout the state has been greatly improved.

Publicity

1. County agents advertised class work and public demonstrations by means of announcements given at public gatherings or through the local press and circular letters, stating time and place of meeting.

2. In case of Project Leaders Training Schools only project leaders were notified unless the type of work was of such a nature that a limited number was not necessary.

3. Accomplishments reached were published in the State Extension News as well as in county local papers.

4. Publicity was also obtained through exhibits and fairs showing hats, dresses or other clothing constructed through project activities. In this way communities which had been disinterested became enthusiastic and ready to avail themselves of benefits derived through Extension service and by complying with designated requirements.

5. In many cases where certain communities were disinterested or unable to send representatives to attend an initial county demonstration for leaders, the leaders who were present from other locals agreed to pass the demonstration on to these communities, at the same time exhibiting samples of completed work. In this way publicity was given to project activities in convincing others of benefits which may be derived through clothing accomplishments.

Methods of Demonstration

1. TRAINING SCHOOLS HELD—Project Leader's training schools have been held from one to three days in each of 20 counties in the State, at which time state clothing specialists have given intensive training in project work. One or more leaders were selected from communities which had made requests for the work, and were pledged to be in attendance at the demonstrations given.

.

Training schools were held at the Agricultural College at Logan where leaders were called in from all organized counties in the state for a week's training in project work.

2. PRESENTATION OF SUBJECT MATTER—Regular laboratory class work was conducted in all Clothing projects. Leaders were instructed in the making of samples such as patterns, dresses, children's clothing, hats, tailored finishings, dress forms, and in the cleaning and pressing of suits and dresses. The Clothing Specialist would give a lecture demonstration, after which individual assistance was given. This gave an opportunity for leaders to observe possible methods which could be used in presenting the same work to community groups under their direct supervision. It also provided a chance to work out necessary exhibit material for follow-up work, and furnished varieties of methods in clothing construction, no two articles of clothing having been made alike.

The specialists in charge of schools would lead in the discussion of problems pertaining to follow-up work; in defining duties of leaders, in creating interest in communities, in obtaining necessary supplies for class work, in setting definite goals, and in obtaining results of work completed.

Each project leader was requested to fill out a report blank showing amount and saving of work done while attending the school. This was valuable and used as an example to emphasize the necessity of collecting results for county and state records.

In order to clarify subject matter, illustrations were given by way of blue prints, charts, and mimeographed instruction leaflets. These were placed in the hands of leaders for use in conducting demonstrations.

Dress Form Project

All of the 20 organized counties have made dress forms. This project has been the initial one for the last two years. It has been especially valuable in defining the duties of project leaders and has done more toward the organization of programs of work than any other phase in Extension fields. It has been a definite piece of work which has been exceedingly popular and beneficial in the construction of clothing; it has been a means of creating

enthusiasm and has accomplished its purpose without failure in any way. It has paved the way for other projects. There has been a total of 2,092 forms made throughout the State.

Millinery Project

Next to dressmaking, millinery has been the most popular phase of clothing given during the year. Fourteen counties and one hundred eight communities have been reached through this project. In each of the counties, training was given for project leaders in one or two centers. These leaders met with their groups, gave regular laboratory practice and collected reports. It has been impossible to receive 100 per cent reports, however at least 98 per cent of the goals set have been reached, and in many cases more than doubled. In Morgan, Summit, Utah, Salt Lake, and Weber Counties, the urban communities are making the majority of their hats as well as dresses as a result of Extension Service.

The State Specialist has been assisted in this work by Miss Ethel Richert and other Home Demonstration Agents making it possible to satisfy most of the demands during the millinery season.

From reports which have been received 2,143 hats have been made during the year, with some of the reports on Fall Millinery yet to come in. In connection with this number there has been a saving of \$6,018.27.

Dress Construction

Instruction has been given in dressmaking in nineteen counties. The State Specialist has conducted leaders training schools at the Agricultural College for county and community leaders, also given training in counties for follow-up work with organized groups.

Elementary and advanced dressmaking have been included in the project. Foundational patterns have been constructed and adapted for use in developing simple dresses. Including patterns drafted and articles made, there have been 9,123 with a saving of \$21,636.25. These totals also include clothing made in remodeling.

Children's Clothing

Last year the work given in children's clothing was considered a phase of dress construction, but this year has been given separately from other clothing projects. Thus far it has been taken to two counties, with plans to reach at least ten counties.

Remodeling Project

Mrs. Anna Otte, Emergency Specialist, was employed while the Clothing Specialist was on a three months leave of absence. She did some very splendid project work in remodeling in Summit and Box Elder Counties. The work was taken to communities instead of being given as training for project leaders. Old suits, coats and dresses which had been taken apart, cleaned, and pressed were brought for remodeling. Other suits, coats, dresses, and capes were cut, fitted, and made ready for finishing. Some of the tailored dresses made were justly valued at \$75.00 and more.

All reports of work done have not yet been handed in.

Project in Renovation, Cleaning and Pressing

Previous to the time that Mrs. Otte gave remodeling, she demonstrated methods in the treatment of materials to be remodeled. She gave methods in the use of dyes, soaps, gasoline, and other cleaning agents. She also gave demonstrations in the cleaning and pressing of men's and ladies' suits. Demonstrations have been given to groups of boys on the cleaning and pressing of suits. A total of 1,120 articles have been cleaned and pressed including follow-up work.

Project in Tailored Finishings

This work has been given by Miss Richert and the Clothing Specialist. Six counties have been reached in which goals were set, four of which have been accomplished.

The tailored finishing project has been the outcome of requests for help in special finishings in dress construction. As time could not be allowed for this during the elementary and advanced dressmaking, it was decided to give at least one day of training to project leaders in this work.

Bound button-holes, cordings, pipings, facings, bindings and special stitchings were taught and the leaders made samples of the same. By adapting these finishings, dresses were made to look tailored and distinctive.

Miscellaneous Activities

As has been explained regarding Costume Design, other lectures have been given in Clothing phases which cannot be tabulated by way of following reports. Martha Jane Phillips of the North American Dye Corporation was in attendance at the Summer Encampment held at the Agricultural College in July. Farm Bureau members were assembled from the entire State, and one lecture was given to the women on dyes, and methods of dyeing, which was of vital interest.

During the Encampment, contests were held in the making of dress forms, hats, and dresses. This work was conducted by Miss Richert as the Clothing Specialist was on leave of absence.

During January a Housekeepers' Conference was held at Logan, also one at the Branch Agricultural College at Cedar City. At Cedar City propaganda work was given to general assemblies, but at Logan, intensive training was given for two weeks to project leaders. Dress construction, Dress Forms, Millinery, and Tailored finishings were the phases given.

The Specialist was in attendance at an institute held at the Granite High School, at which time the women of that district had asked for demonstrations in dress form making and millinery. Two demonstrations were given in these lines.

Junior Extension Work

During March a Junior Club School was held at Logan. Laboratory practice was given in dress construction and Millinery. Each girl made an outline of work to be followed in the making of simple dresses, underwear, and soft sport hats. Twenty-four clubs were organized, four of which have not been reported. Goals which were set shows 75 per cent completion of articles made. Owing to the fact that the Clothing Specialist was away for the summer, and no one was appointed to check up on work to be done, definite reports of activities cannot be given.

Totals of Work Done

No. counties reached.....	20
No. communities reached.....	214
No. leaders met	693
No. training schools held.....	168
No. activities completed	16,692
No. conferences with leaders.....	693
No. dress forms made	2,092
No. patterns cut	3,227
No. garments made	9,346
No. hats made	2,471
No. garments cleaned and pressed	1,149
No. tailored finishings made.....	531
No. meetings held by Specialist.....	503
Total attendance	8,981
Total savings in clothing	\$42,534.08

Counties	Dress Forms		Clothing Garments Made	
	No.	Saving	No.	Saving
Beaver	187	\$ 354.00	339	\$ 485.85
Box Elder	346	2,063.41	1,052	2,224.79
Cache	60	353.75	243	539.41
Carbon-Emery ..	100	250.00	295	279.20
Davis	292	852.40	337	1,095.15
Iron	51	253.40	366	726.50
Juab	90	279.00	172	181.28
Millard	17	68.00	223	370.02
Morgan	137	449.90	558	2,187.37
Piute	38	121.15	73	54.65
Salt Lake	584	1,944.40	2,251	6,371.29
Sanpete	241	860.00	366	631.99
Sevier	111	444.00	171	305.26
Summit	31	93.00	774	4,780.49
Tooele	167	501.00	323	334.00
Uintah	12	40.00	37	50.40
Utah	775	2,404.00	1,631	3,289.25
Wasatch	171	560.30	216	157.90
Wayne	3	13.80	317	355.32
Weber	134	1,810.90	1,592	3,355.67
Conventions	9	7,028.56	120	317.75
Totals	3,609	\$13,842.31	11,266	\$27,654.54

COUNTIES	Commun- ities	Conferences with Leaders	No. Leaders Met	Training Schools Held
Beaver	5	5	24	2
Box Elder	19	16	38	17
Cache	9	12	33	5
Carbon-Emery	10	9	14	4
Davis	12	9	29	6
Iron	6	11	26	4
Juab	6	5	58	9
Millard	2	8	12	4
Morgan	7	13	33	4
Piute	5	3	13	2
Salt Lake	20	20	40	21
Sanpete	14	4	18	4
Sevier	12	7	27	4
Summit	13	23	25	4
Tooele	8	2	51	5
Uintah	6	8	10	4
Utah	24	26	77	4
Wasatch	6	2	54	7
Wayne	5	14	10	10
Weber	16	17	23	13
State Conventions		20	78	35
	214	234	693	168

Statistical Report of Work Done by State Specialist in Clothing

November 30, 1920, to November 30, 1922

COUNTIES	Articles Cleaned and Pressed		Samples of Tailored Finishings	Total Activities Completed
	No.	Sav- ings		
Beaver	65	\$ 96.50	..	591
Box Elder	114	257.25	..	1,512
Cache .....	..	....	..	303
Carbon-Emery .....	..	....	..	395
Davis .....	..	....	..	629
Iron .....	..	....	..	417
Juab .....	..	....	..	262
Millard .....	..	....	54	294
Morgan .....	..	....	..	695
Piute .....	..	....	..	111
Salt Lake	5	7.50	27	2,867
Sanpete .....	..	....	..	607
Sevier .....	..	....	..	282
Summit .....	..	....	..	805
Tooele .....	..	....	..	490
Uintah .....	..	....	..	59
Utah	176	179.50	255	2,837
Wasatch .....	..	....	110	497
Wayne .....	..	....	53	373
Weber	789	224.25	22	2,537
Conventions .....	..	....	..	129
Totals	1149	\$765.00	531	6,692

HOME HEALTH AND NURSING

The Home Health and Nursing Project Number 20 of the Extension Service was begun on October 1, 1920, and is supported by State funds only.

The work has been given to the public in popular lecture demonstration form under the direction of the Extension Specialist.

Principal Problems Attacked from Nov. 30, 1920, to November 30, 1922

The principal health problems attacked during the past two years in project form were: The alimentary tract and elimination; the treatment and prevention of colds; the use of Hydrotherapy in the home as a preventive and corrective measure; posture and dress in relation to health, including the choosing and fitting of approved shoes; first aid for cuts, burns, bruises, and sprains; use of equipment in the home health cupboard; pre-natal care; hygiene of the hair, skin, teeth and feet; pulse, temperature, and respiration and recognition of danger signals.

The work is taken in a county by request of the County Extension Agent, and handled in co-operation with Women's Clubs, Girls' Clubs, Schools, Farm Bureau, L. D. S. Relief Society, and other organizations. Each phase lends itself readily to one or more definite activities which can be carried on in the home in project form by pledged demonstrators.

When health work is started in a community, local leaders are chosen who act under the direction of the county Extension agent, and her duties are: To assist in choosing a program of work; to arrange group meetings for instruction and demonstration; to notify group members of all project activities; to assemble necessary equipment for demonstrations, and assist in the demonstrations; to help get pledged demonstrators; to help in the follow-up work, and send records to the agent.

The pledged demonstrators agree to establish the demonstrations in their own homes, and report the results of their work to the local leader.

Schools for local leaders were held giving special instructions in demonstration work under the direction of the Extension Specialist who furnishes outlines of the different phases of work, and presents definite regimes that are to be followed by local leaders and co-operators.

County agricultural agents and home demonstration agents assist in the follow-up work and collecting of records. The State organization committee assists the Specialist in developing the State program and this is submitted to the State committee on projects for suggestions and approval.

Methods

The State Specialist is responsible for subject matter and for detailed plans of work with reference to her special subject, in counties and in communities. She assists the home demonstration agent and the county project leader in planning and scheduling the work in the county. She has general supervision and direction of projects, plans, methods, records, and visits, and gives demonstrations in each organized county as often as possible.

The State Specialist furnishes instructions and information for project lesson sheets and for project records and report blanks, as necessary in the progress of the work. She trains the home demonstration agents, and the project leaders so that they may gradually assume more responsibility in establishing and extending the work by progressive follow-up methods. The Specialist clearly outlines follow-up methods, with such specific directions as may be necessary. She gathers and compiles all county records of work done in her projects and reports in duplicate the progress of her work, with accurate data and at specified intervals to the State Home Demonstration Leader.

Publicity

The Specialist meets the request of county agricultural agents for the work to be done in their counties. She is scheduled for a community, notices and programs of work are sent out by the county agent or home demonstration agent to the local chairman or leaders. Circular letters may be sent to all members of the local organization; on Sunday previous to the meeting notices are given out in the local churches. If there is a local newspaper, notices giving time and place and subject to be taken up are published.

The local leaders assume the responsibility of arranging time, place, and securing material for demonstration and notify the members of the organization.

Past Methods of Securing Report Blanks

In the past, the home demonstration agents and local leaders have been held responsible for collecting report blanks. In counties where there is no home agent the county agent has assisted. The Extension Specialist has been able to assist in a few counties by meeting groups of leaders and demonstrators, teaching and assisting them with making out the reports. Pledged home co-operators are secured to test out in home practice the practicability and effectiveness of information and methods furnished by the Specialist; the follow-up work by home demonstration agent, and by local leaders trained and supervised by the Specialist in technique and methods of securing reports. It seems difficult to get the data required. The demonstrators are willing to carry out the regime, and try out suggestions made to them, but are reluctant about filling in report blanks and stating just what has been done. The project results can only be measured by number of successful practices established in home and number of local leaders actively co-operating.

The Most Important Piece of Work

It is difficult to class one piece of health information as of paramount importance. Each phase correlates to form a program for positive health. The treatment and prevention of colds has been the most popular project, but is by no means the most important. Measurements of standards for health are of greatest importance, as it helps the parent to visualize a health picture and realize the importance of the right foods in right amounts. It helps the parent to recognize deviations from health and realize the importance of having corrective work done. It brings to the attention of mothers the effect of clothing and its relation to health, especially the shoe, and creates a desire in parents to build toward a better health standard.

Changes in Home Health and Nursing in the Past Two Years

First, the realization of the part food plays in health.

Second, the effects of posture and clothing on health, more particularly the shoe.

Third, the fact that nursing procedures should be used as preventive measures rather than curative. There

is an increased demand for scientific guidance for health building, in a form easily adapted to the home.

An increased demand for more health work is being made by all counties where the work has been given. Some of the work has been introduced into counties this year for the first time, and the women do not understand just how to carry it on in project form, but are anxious to have training schools for leaders and carry the work on next year. Rural women in general are becoming better informed in regard to home health and are taking a keen interest in its development.

Outlook

The outlook for Home Health work for the coming year is very encouraging. The awakening of an appreciation by the general public of the importance of Extension work has made it possible for the Extension Specialists to keep up a wholesome agitation for higher health standards. The lack of public health nurses, home demonstration agents, and well trained local leaders to do follow-up work in the communities make it impossible to secure as measurable results in health work as are obtained in dressmaking, millinery, etc.

Many of the counties are sparsely settled and many miles from a physician. The women depend upon patent medicines to cure all ills. They have been handicapped by lack of knowledge, by remoteness from sources of relief, and in many cases are following old customs and traditions that to them seemed the only way. The economic impossibility of providing competent medical and surgical care for the family has proved to be a great problem. We hope to co-operate with other health agencies and make it possible for rural families to have this needed medical supervision.

The introduction of the simple but effective water treatments as preventive and corrective measures have been of inestimable value and greatly appreciated by the women. For the coming year we hope to put greater stress upon positive health for the family, by teaching the parent to score the child and help her to understand what we mean by positive health. The score card prepared by Dr. Caroline Hedger of the Elizabeth McCormick Memorial Fund will be used. Food and its relation to health will be emphasized. Posture and shoes in relation to health will be stressed. The Specialist will encourage

wearing of correct shoes especially by women and children. Prenatal and infant care will be given special attention this year.

The demand for the work has increased to such an extent that it is impossible for the Specialist to meet all requests. We are looking forward to a very successful year.

The department from Washington can help, by making suggestions for better methods of putting over the work, by letting us know what other states are accomplishing, and by sending bulletins, lantern slides, or lectures or any information available on health work.

Summary of Work Done in Home Health and Nursing

From November 30, 1920, to November 30, 1922

Total number counties reached.....	21
Total number communities reached.....	123
Lectures and demonstrations given.....	602
Total attendance	20,368
Total number leaders present.....	667
Number of women carrying on activities...	2,981
Number reporting activities	1,405
Home visits	46
Training classes held for leaders.....	56
Training class attendance	989

Total Number Communities Reached with Projects

Elimination	120
Colds	120
Dress and Posture	35
Hygiene, Hair and Skin.....	11
Hydrotherapy	28
First Aid	8
Use and Equipment in Home Health Cupboard	17
Use and Equipment in Community Cupboard.	5
Prenatal Care	7
Infant Feeding	10
Bed bath and bed making.....	2
Goitre	5
Danger Signals	1
Rural Health	2
Shoes and their relation to health.....	10
Pulse Temperature and Respiration	2

Recommendations

For the coming biennium we recommend:

The employment of a full time Markets' Specialist in lieu of the present part time arrangement, and the continuation of the Market News Letter.

The extension of county agent work to two additional districts.

The addition of one home demonstration agent.

The employment of a Foods Specialist to fill the present vacancy.

The extension of work in home recreation, home furnishing and decoration, and in rural architecture.

The establishment of the position of publicity agent on full time jointly by the College proper, the Experiment Station and the Extension Division. Such agent also to edit all College publications.

The extension of community service work to include debates and oratorical contests, on live agricultural and home subjects at farm bureau meetings and other public functions. Suggested lists of topics to be prepared by the Agricultural College and material furnished to debaters by the College upon request.

Respectfully submitted,

R. J. EVANS,
Director, Extension Division.

BRANCH OF THE AGRICULTURAL COLLEGE

To the President of the College:

Sir: I have the honor to submit herewith the report of the Branch of the College for the past biennium together with needs of the institution and recommendations for the next biennium.

The records show that the school has made consistent growth, especially during the years just preceding. Not only is this true in point of numbers of students but also in territory from which students come to attend school and in the influence of the institution in the communities of this country. This year, at the present time, the enrollment of regular students exceeds the gross enrollment for any previous year. Nearly every town of seven counties of Southern Utah is represented, the majority of the registration being from outside of Cedar City.

The general morale of the student body is good, and the co-operation of the townspeople is all that could be expected, both in caring for incoming students and in supporting the school policy.

The faculty of the institution has been built up to an exceptionally high character. The members are efficient in their lines and without exception are of high moral character. Instruction is going forward satisfactorily. Due to the large enrollment of the present season there is, however, overcrowding of classes with the result that in some sections teachers are very much overworked in attempting to do justice to their classes. It has been necessary to limit the registration in some departments, particularly in Home Economics and Mechanic Arts, and to some extent in the Commercial Department, because of lack of room and equipment. Many students are this year prevented from receiving instruction which they desire.

The result of the rapid growth which the institution is making will soon bring about acute conditions both in the school and in the matter of housing the incoming students in Cedar City unless relief is forthcoming at a not distant date. It should be borne in mind that Cedar City is a growing town wherein homes, as they become available, are at once occupied generally by permanent residents, leaving not much surplus room for the accommoda-

tion of students. Under "recommendations" reference is made to possible solutions of these problems.

The budget for the next biennium submitted to you recently, calls for an increase of funds over the present biennium for general maintenance purposes. The increase is to relieve the overtaxing of teachers in their class work by adding more teachers to the force and in order to replace broken and worn out equipment which has been accumulating and which it is impossible to replace this year. No provision is made in the submitted budget to relieve the crowding of departments and the inability to handle more than a certain number of students in certain phases of the work due to lack of floor space and inadequacy of equipment.

The available floor space is not sufficient to properly house the departments of the institution as at present constituted. In order to get along it has been found necessary to submerge certain sections with the work of another department. For instance work in biology is carried on in the quarters of the Agricultural Department, floor space of which is inadequate for agriculture alone. With the pending growth of the school, or if the departments were enlarged to meet present needs, the available floor space in the present buildings of the institution would be far insufficient.

The Branch Agricultural College as a practical school, the main purpose of which is to train the youth of the land to better live in and develop this southern country, is in the main accomplishing the purpose of its establishment. As a school of Agriculture and related departments the classroom work is efficient and the laboratory work goes far towards connecting up the theoretical with the practical. In my estimation, however, there is possibility of extending the laboratory beyond the school buildings, out into actual practice. It appears to me that there is opportunity at this institution of actually constructing the school plant and in a measure maintaining the institution by help in the form of project instruction from the various departments. It might take longer to complete the work and at times the product may not be of professional grade, but that the work of building the school plant largely with student help can be done I feel confident. The result would be two-fold. The plant would grow with the needs of the institution rather than by large additions intermittently. The main good, however, should come from supplementing classroom

instruction with actual practice in the lines the student is studying. Students of agriculture would be employed on the school farm. Those following the lines of mechanic arts would be interested in building, and the home economics girls might do most of the work connected with dormitories which should be operated at the institution. It will appear at once that this type of education is not a new thing. All phases of it have already proved highly successful in other schools of this and other countries. Our problem would be in adapting it to our needs and to securing competent leaders to direct the system.

Allow me to make the following recommendations to meet, as I believe, the growing needs of the Branch of the Agricultural College:

I. Permanent Maintenance Fund—That a more permanent general maintenance fund be provided. The present mill tax funds for this institution for each year of the next biennium are estimated at \$28,500, while the budget submitted calls for \$65,000 in the aggregate. After the estimated moneys from fees and sales are added to the mill tax moneys it leaves the amount of \$32,000 for each year to be asked of the legislature as a special appropriation for general maintenance.

II. New School Buildings—That a Home Economics Building and an addition to the shops of the Mechanic Arts Department are seriously needed, and that these be provided as a solution to the inadequate floor space now available for departments. These additions would take care of the departments most seriously handicapped at present and their construction would also make available for other departments the space now occupied by these departments, thus relieving the whole crowding situation in the institution.

It may be impossible to come near supplying the requirements of the institution at once. The most urgent needs and matters which demand immediate consideration are more room in the Mechanics Arts Department and additional farm buildings in the nature of poultry houses and sheep sheds. I would recommend that herein is an opportunity to try out on a limited scale the construction of buildings by student help. Listed below are the estimated costs of constructing the buildings needed.

III. Dormitories—In order to relieve the serious problem of properly housing incoming students, which will become a more strained condition as time goes on, because of the fact that the school is now growing mainly by addi-

tions of students from outside of Cedar City, it is urgently recommended that the construction of dormitories at the school as soon as practicable appears to be the proper solution of this problem.

IV. Demonstration, not Experimentation—That this school plant be used so far as feasible in demonstrating practical application by the best approved methods, the vocational subjects of the curriculum—that the construction and development of the school plant so far as practicable be the laboratory of the various departments of the institution. That a limited number of students be employed on the school farm, and generally about the school, the year round, thus also offering a means for students to work their way through school.

No doubt the system should be gone into gradually. During the next biennium only a beginning could be made.

New Buildings

Home Economics Building, (Equipped)	\$60,000.00
Girls' Dormitory, (Equipped)	45,000.00
Additions to Mechanic Arts Building	15,000.00
Sheep Sheds	2,000.00
Hen Houses	3,000.00

Respectfully submitted,

J. HOWARD MAUGHAN,
Director.

DEPARTMENT OF ACCOUNTING AND BUSINESS PRACTICE

To the President of the College:

Sir: I have the honor to report herewith the Department of Accounting and Business Practice for the past biennium.

The aim of the department has been to meet the needs of three classes of students. (a) Vocational—those seeking immediate employment as bookkeepers, stenographers, typists, calculator operators, office clerks, and posting machine operators; (b) Professional—those seeking professional rank as certified public accountants, cost experts, income tax specialists, heads of accounting departments, court reporters, private secretaries, and office managers; and (c) General—those seeking advancement as business executives, or as professional men who need a thorough knowledge of the fundamentals of accounting to better enable them to meet the various business situations as they arise, to analyze and interpret financial reports and to properly evaluate the business facts which lie behind them.

That the students are gradually coming to realize the importance of some accountancy training is evident from the increasing enrollment in the department.

The average enrollment was:

(a) In 1920-21	
Regular residence	242
Summer School	50
Correspondence and Extension..	70
(b) In 1921-22	
Regular residence	262
Summer School	98
Correspondence and Extension..	55

The average teaching load for the department for the same period was: (a) in 1920-21 twenty hours per week and in 1921-22, eighteen. Two hours of laboratory work were considered equal to one lecture hour in computing teaching load.

When the call came for all departments to go the limit in the matter of cutting down expenses, a re-alignment of

all courses was made to the effect that we were able to reduce the teaching staff in 1922-23 from four to three full time instructors. The vocational and junior college courses were consolidated and they now constitute our practice courses, the aim being to train for the immediate job. All professional courses were shifted to the upper division and train for the professions of accountancy, business administration or the other professions.

A substantial cut was possible due to the fact that Miss Thelma Fogelberg is able to teach both Gregg and Pitman shorthand.

As a further enlargement of service, Mr. Thain and myself are each conducting a class in business administration, and I am continuing the two extension classes at Ogden.

The department hopes that the institutional finances will be eased in the near future as we shall need greater allowances for the maintenance of departmental equipment and for some very necessary additions.

Respectfully submitted,

P. E. PETERSON,
Professor of Accounting.

DEPARTMENTS OF RURAL ARCHITECTURE, SURVEYING AND ROADS

To the President of the College:

Sir: I have the honor to report herewith the Departments of Roads, Rural Architecture, and Surveying, for the past biennium.

Due to the large sums of money now being expended by the Federal and State Governments for highway construction there naturally follows a demand for men trained in the principles and practice of highway construction. Our Department of Roads, therefore, has been called upon to handle much larger classes in this line of work than in the past. We are also training about 50 men for the Veterans' Bureau, about half of whom are completing the degree course and half taking a two year course.

The work in Rural Architecture, due to the temporary depression in agriculture, has not had the growth that the work in Roads and Surveying has had. We are receiving requests for plans of one kind or another almost daily, but the help furnished the Department is not sufficient to take care of these requests satisfactorily.

In the Surveying Department the classes have enlarged considerably, due to the fact that much interest has been developed in the road work and irrigation work, and the surveying is fundamental to both of these departments.

Due to the resignation of Professor J. S. Powell, of the Mechanical Drawing Department, we have secured the services of Professor Edmund Feldman, a practical and well-trained engineer, who will be of great service in these growing departments, in addition to his work in Mechanical Drawing.

Respectfully submitted,

RAY B. WEST,
Professor of Agricultural Engineering.

DEPARTMENT OF AGRONOMY

To the President of the College:

Sir: I have the honor to report herewith the Department of Agronomy for the past biennium.

The past biennium has been for the Agronomy Department, one of considerable growth. In some places, however, lack of needed growth has been only too apparent.

New quarters in the Plant Industry Building have been very satisfactory. The rooms are large, well-lighted, and adapted to agronomic work. At none of the schools visited have more desirable quarters been found. Nearness to our cellar and seedhouse has made transfer of materials more convenient. The greenhouse now being built will make the building equipment still more desirable.

There has been considerable increase in the number of college students but considerable decrease in the number of vocational students, except for the vocational Federal Men, of whom there has been usually two classes each quarter. In addition special work has been given one day each week on Practice Farm No. 2 since it was in full operation.

A number of years ago very few students did work beyond the elementary and required courses. During the last two years classes of advanced men have been organized in Soil Fertility, Seeds and Grading, and History of Agriculture. In addition there has been a call for advanced courses in Plant Production, Soil Technology, Soil Survey, Dry-Farming, and Plant Genetics, but none of these have been given owing to a too small departmental staff.

Graduate work in the department has just entered a period of important development. There has usually been one or two men doing more or less irregular work toward a Master's degree. Now, however, there are seven men pursuing regular courses, one of whom will finish in September, 1922. The others will finish either in June or in September, 1923. The number of men doing graduate work would undoubtedly increase with an enlargement of the departmental staff and consequently of the advanced courses offered. Unfortunately it has not been possible to give advanced courses during the Summer Quarter, although there has been a demand.

In 1921, there were 13 B. S. degree graduates from the Department of Agronomy; in 1922 there were 14 graduates. It may be interesting to know that of these 14 men of the 1922 class, one has taken a Master's degree and obtained a \$2,400 position; two are doing graduate work; one is running a large seed farm; another is Nematode research specialist for the Amalgamated Sugar Company; and others have all adopted positions varying from \$2,400 for twelve months to \$1,440 for nine months.

In addition to the regular college instruction, the members of the departmental staff have assisted in various activities of the State, such as seed testing, grain and alfalfa seed grading, and advising farmers. Two phases of work in great demand at present are seed testing and seed certification. Grain grading for farmers would also rapidly develop were it encouraged.

Needs of the Department

The most urgent need of the Agronomy Department is a full-time instructor. This would permit the handling of Summer Quarter by a faculty member instead of by a student as has been the case during the last two years.

Summer Quarter is one of great opportunity. Directly the College can greatly increase its attendance of mature people; indirectly the presence of a good feeling toward the College on the part of high school faculties would encourage high school graduates to enter here.

Several courses are not taught at all and several others no oftener than can be avoided. If a full-time instructor were added to the staff he could develop these courses. One vocational course each quarter for Federal men could also be taught by this man.

Several young men have, one at a time, been student teachers. All except one became a good teacher. One especially showed ability both in teaching and leadership, besides some talent for writing. Since we could offer him only \$40 a month as student assistant he sought work elsewhere. He left for a \$2,400 position, though he said he would have preferred to remain for \$1,800. Now a new man is being given the experience all over again. Just when an instructor can begin to serve, he is graduated and must leave.

It is also desirable to have one student assistant. However, a regular faculty member is more sorely needed.

Another need of considerable proportions is that of student laboratory desks. Only half enough could be purchased when the building was occupied two years ago. The General Soils laboratory needs a built-in desk and a case with some shelf room. The General Crops laboratory needs two cases and a set of tables or desks that are adapted for student work. The Seed and Grading laboratory needs a table with drawers and space for holding small tools and supplies.

An Advanced Soils Laboratory, at present occupied by the Soils Survey department, is needed for the accommodation of advanced students who wish to work on problems. This room contains one large student desk and needs another similar one.

On the whole floor, hoods need finishing and wall tables ought to be built in. In all laboratories there is no satisfactory arrangement for seating. Stools of adjustable height would help. There are scarcely enough chairs on the whole floor for one laboratory section. Every chair is moved for crops laboratory classes and then back for soils classes. There is no satisfactory place for hot plates and like equipment.

In the halls are supports on which to mount exhibits. Suitable cases for holding exhibits could be put in at little expense.

During the last five years complete sets of bulletins of states and U. S. Department of Agriculture have been tediously collected. At least, those of the U. S. Department ought not to be lost because they are the only sources of information in many cases and because most of them are not now obtainable on account of the supplies being exhausted. Binding would preserve them. There are about 100 volumes of U. S. Departmental bulletins and about 200 volumes of state bulletins. The Agronomy Department will donate to the College Library the State publications if they can bind them. It, however, feels greatly in need of the Federal publications in the department. The binding could be done a few volumes a year if more rapid preservation is not possible.

Many articles of smaller equipment, such as soils laboratory testers, seed germinators, seed cleaners, grain cans, and microscopes are needed, but can be omitted if we do not attempt to train our students more thoroughly than can be done in the general courses.

General Library

The great incompleteness of our general College library is a serious handicap. In agronomic work only a few elementary texts are owned at all, and many of these are worn out. Reference work by students is nearly impossible. For example, in History of Agriculture there was found from various text books, reference to 43 source books. A search in the library discovered only four of these, and they were incidental ones, such as did not cover the subject. In looking up one phase of a problem 7 hours hunting for references discovered so few that all that were found could be read in 2 hours. In other phases of the work there is not a single book or paper. A few phases are well represented but not one is what might be called reasonably complete. Our library is a serious handicap; studying a subject deeply is too unprofitably laborious to be done. It is not encouraging to hunt for books when they usually cannot be found.

Several agricultural magazines of international circulation do not come to our library at all. To be specific, the Journals of the Royal Society of Agriculture, neither of London nor Edinburgh, can be found here. A list of about 50 articles on plant and seed problems was obtained from Cornell University, but all except five were found unavailable because these two magazines are not represented on our shelves. This is probably the best set of agricultural articles in the world. Besides, most of the reports from Rothamsted are not to be found.

Now that we are attempting to begin training graduate students, the necessity of reasonable library equipment becomes woefully apparent.

Respectfully submitted,

GEORGE STEWART,

Professor of Agronomy.

DEPARTMENT OF ANIMAL HUSBANDRY

To the President of the College:

Sir: I have the honor to report herewith the Department of Animal Husbandry for the past biennium.

Appropriations

The department gratefully acknowledges the special appropriation of \$9,000 which the last Legislature made for the purpose of livestock. This has made possible the addition of much needed and very valuable animals to our flocks and herds, which brings them up to a satisfactory standard for the present. We also appreciate the appropriation of \$1,000 for the renewal of certain fences surrounding our pastures. This money has been very economically spent and the fences built are substantial and should be serviceable for many years to come.

Labor

A matter which has been repeatedly mentioned without results is that of the length of hours, Sunday and holiday work of our men at the barns. They actually put in from one to two hours longer each day than men in other departments doing a similar grade of work, and in addition have to work nearly full time on Sundays and holidays when the other men are free. It would, therefore, seem only just that their pay be increased at least $\frac{1}{7}$ over the pay of men doing similar work, though actually spending much less time. It is felt that such an adjustment in accordance with effort required, would be no more than just and would greatly increase the efficiency of our men.

Instruction

The department is now offering instruction in the following courses.

C. Feeding and Management (Vocational)

1. Market Types (Judging)
2. Breed Types
6. Beef Cattle Production
7. Horse Husbandry

8. Swine Management
9. Sheep Husbandry
101. Livestock Management
102. Practical Feeding
103. Animal Nutrition
104. Laboratory Work in Feeding
105. Principles of Breeding and Herd Book Study
106. Advanced Stock Judging
110. The Field of Animal Husbandry
120. Research in Animal Husbandry
125. Seminar.

During the year 1920-21 instruction was given in 14 different quarter courses, with a total registration of 238 students. In 1921-22 the number of quarter courses actually taught was 13 which accommodated 228 students.

In addition to these courses animal husbandry work was given a large number of Federal Vocational Trainees. A special instructor was provided for this work and the department had only general supervision over it.

Special work was also given by the department at the Practice Farm. This included regular lectures three times a week during 1921-22, as well as general advisory work.

In addition to the teaching work the department is called upon to judge the livestock at County and other fairs and to appear at times in Extension Service meetings throughout the State.

We also have rather a heavy correspondence from farmers and livestock men throughout the State. An average of 30 or 40 letters a week are received and answered. The care and thought necessary to do this properly requires considerable time.

The department now does a business of over \$10,000 a year. The time required to give proper consideration to the details of sales and expenditure of this amount of money is a heavy drain on departmental time.

A great deal of time is also required to keep the registration, breeding, feeding and other records on all the animals at the barns, and general supervision of the animals and work at the barns necessitates considerable attention.

Teaching Force

The College is giving inadequate attention to the live-stock interests of the State. Livestock is without doubt one of our major industries, and yet the Institution is giving only approximately the time of one man to instruction in this work. The head of the department is spending half of his time in Experiment Station work. The only other man giving attention to the work is also head of the Dairy Department and spends about one-half of his time there.

The addition of one more man to the department is badly needed. This man should be trained in sheep husbandry and be able to look after the details of the flock at the barns, as well as teach the necessary courses in sheep husbandry and wools. He might also be available for a limited amount of Extension work.

It is estimated that the sheep business of the State will this year bring in (mostly from outside the State) in the neighborhood of \$12,000,000. This is actual money added to the State and not the wealth of figures brought about by the exchange of commodities among ourselves. Surely an industry so vital and of such magnitude merits the attention which would be possible by the addition of one member to the teaching force.

This addition would permit work in other fields now demanding attention. As a single example might be mentioned courses in slaughtering, cutting, curing, handling and preparation of meats and their by-products for home use and for market.

Respectfully submitted,

W. E. CARROLL,

Professor of Animal Husbandry.

DEPARTMENT OF POULTRY HUSBANDRY

To the President of the College:

Sir: I have the honor to report herewith the Poultry Husbandry Department for the past biennium.

The instructional work represents about one-half time of the one member of the department. The balance of the time is divided between the Extension Division and the Experiment Station, which will be reported separately.

There has been a large number of students in the department who have been sent here by the Federal Board for Vocational Education, for special training in poultry.

There is also a rather marked increase in the number of regular college students taking this work, as compared with the previous biennium. No change was made in the personnel of the department until July of this year, when Mr. Vernal Willie of the 1922 graduating class was employed as assistant.

The following is a summary of the number of classes given and the number of students each quarter:

	Winter	Spring	Summer	Fall
No. of classes.....	5	4	2	2
1921				
No. of students....	59	65	30	24
No. of classes.....	5	6	2 (one)	4
1922				
No. of students....	81	104	27	89
No. of students....	140	169	57	111
Total				
No. of classes.....	10	10	4	6

A total of 30 classes and 477 students for the two years as compared with 18 classes and 179 students for the previous two years.

The present working force of the department can, I believe, carry on the work of the department for the next two years. The work could be made more efficient, I believe, by the addition of a small residence at the poultry plant, so that someone living there could be in immediate touch with what is going on there after working hours and on holidays.

Respectfully submitted,

BYRON ALDER,

Assistant Professor of Poultry Husbandry.

DEPARTMENT OF AGRICULTURAL ECONOMICS

To the President of the College:

Sir: I have the honor to report herewith the Department of Agricultural Economics and Farm Management for the past biennium.

Two years ago only one-half the time of the head of the department was devoted to teaching, but the past year two-thirds of his time has been thus employed and the other one-third has been employed in Experiment Station work, and paid for from Station funds.

Since more time has been devoted to teaching, four new courses have been given by the department and also one course formerly given by the late Professor Hendricks, making eleven courses now offered by the department.

New Courses Given by the Department

Vocational Courses

1. Farm Management Practice—Given at U. A. C. Practice Farms.

Graduate Courses

1. Land Economics
2. Tenancy
3. Seminar on Recent Agricultural Economic and Farm Management Literature.

Old Courses Given by the Department

1. Principles of Agricultural Economics
2. Rural Credits
3. Vocational Farm Management
4. Senior College Farm Management
5. Farm Cost Accounting
6. Types of Farming in Utah and the United States.
7. Research in Agricultural Economics and Farm Management.

This makes thirty-seven to forty-five credit hours of teaching each year, besides the committee work, writing

articles for publication, speaking appointments, and Experiment Station and Extension work that the department is called upon to do. In the past two years two hundred sixty students have taken courses in the department. Most of these students were of Senior College standing at the time they took the work.

There is a great demand for additional courses in this department as shown by the many articles in the current agricultural press, speeches of the big men in politics and governments of America and the world, the depressed condition of the farmers, the cry of the cities for cheap food, the American Farm Bureau's interest in this field of work, and the demand for men and women trained in the various lines of work included in the department.

Some of the positions which the department should train men and women for are as follows:

1. Commercial farmers or farm managers.
2. County agricultural agents.
3. Managers of farmers' co-operative business associations.
4. Wholesale and retail dealers in fertilizers, feed, seeds, grains, produce, farm machinery and equipment.
5. Buyers of farm products.
6. Salesmen of agricultural commodities.
7. Federal, state, or private service in marketing farm crops and livestock, insurance, rural credit, transportation of farm products, statistics, accounting, and cost accounting, or determining the cost of production of farm grown products.
8. Agricultural commerce or related fields, such as receivers, shippers, handlers, and storers of soil-grown products.
9. Rural banking agents, such as Federal Farm land appraisers, presidents and secretaries of national farm loan associations, directors of rural banks and credit associations and an enlightened farm borrowing and loaning population.
10. Rural real estate dealers who may not only make profit themselves but who may make a whole community prosperous and thereby become more permanently prosperous real estate men and much more useful citizens in the communities in which they live.

11. Public service men and agricultural assistants to corporations and institutions, railroads, chambers of commerce, banks and associations of various kinds.
12. Advertising and publicity service for agricultural products for various organizations such as the state and national farm bureau federations, the National Wool Growers' Association, the livestock breeders' associations, etc. and last but not least, this Department should train men and women for
13. Teaching in the grade schools, the high schools, extension schools, part time schools, vocational schools, and the colleges of the State, and
14. To do research work in the various divisions and upon the multitudinous problems of agricultural economics which are so urgent and so essential to a proper solution of the problems of agriculture and industry in this and every other country, at this and all times in the history of the world.

Recommended:

This great demand for trained men and women in agricultural economics urges at least the full-time employment of one well qualified man to devote his entire time to the teaching work in this department. This is a present and pressing need and is therefore recommended for the year 1923-24.

Respectfully submitted,

E. B. BROSSARD,

Professor of Farm Management and
Agricultural Economics.

DEPARTMENT OF COMPETITIVE ATHLETICS

To the President of the College:

Sir: I have the honor to report herewith the Department of Competitive Athletics for the past biennium.

Because competitive athletics hold such a favored place in the heart of America and such a unique place in inter-collegiate relations it is, indeed, a pleasure to be able to report that the Utah Agricultural College has made and is continuing to make marked progress in adding to the attractiveness and usefulness of athletics as a department of training in the College.

Competitive sports in the past biennium has continued to be marked by much larger varsity squads, increased emphasis on intra-mural competition and on Freshmen teams, a broadening of our intercollegiate athletic relationships, the introduction of some more minor sports, a splendid student interest and the enlisting of greater public support. And incidentally during the school year of 1921-1922 the football team representing the College won the undisputed championship of the Rocky Mountain Conference, the tennis team won the State championship of Utah, and the track and field team received second place in the Rocky Mountain Conference Track and Field Meet, in which eleven teams competed. But, better than all, the teams have continued to include in their personnel many of the students who are leaders in scholarship and various other branches of student activity.

Not only have the four major branches of sports shown an increase in the numbers trying out for the squads, but, the minor sports such as wrestling, tennis, boxing, swimming, and cross country running, have enjoyed a constantly increasing popularity. That the aim to enlist all physically fit students in some form of competitive play, either in intra-mural or intercollegiate, is gradually being achieved is borne out by the tables of figures below:

Football, college and freshman.....	86
Basketball, college, freshman and class and fraternity series	136
Track, college and class teams	50
Baseball, class and fraternity series.....	85
Wrestling	30
Cross country running	82
Tennis, spring and fall try-outs	35

The athletic teams representing the College competed against the teams representing the following institutions during the last biennium:

1. University of Utah
2. Brigham Young University
3. Brigham Young College
4. Idaho Technical Institute
5. College of Idaho
6. Montana State College
7. Montana Wesleyan University
8. Montana State School of Mines
9. Mt. St. Charles College
10. Colorado School of Mines
11. Colorado Agricultural College
12. Denver University
13. Colorado College
14. University of Colorado
15. University of Wyoming
16. University of New Mexico
17. University of Nevada.

The teams representing the Freshman class competed against the high schools of Utah and Idaho.

In order to equip the large numbers desiring to participate and to carry out the schedules for the next two years the following amounts of money will be needed:

Football	\$2,700
Basketball	500
Baseball	500
Track and Field Sports	400
Minor sports	250
Total	<hr/> \$4,350

I believe that an athletic field on the College Campus would not only excite more interest in the students for athletics and thus encourage more men to try out for the teams, but it would, by virtue of its location, cause the many spectators who attend the athletic contests to inspect our buildings and their beautiful surroundings. If such a change is not to be made in the near future I would suggest that a clubhouse on Adam's Field, in which visiting

and home players might dress and shower, be constructed. Such a house would overcome the inconvenience of the remoteness of the College Gymnasium from the field of play, which is important, particularly in inclement weather.

Tennis has grown to be so popular in the past few years that our few courts are inadequate to handle the many students who wish to play. Several more tennis courts would provide a means of exercise for scores of students and faculty members whose interest in other forms of exercise is insufficient.

Respectfully submitted,

E. L. ROMNEY,

Director of Athletics.

DEPARTMENT OF ART

To the President of the College:

Sir: I have the honor to report herewith the Department of Art for the past biennium.

1921				
Enrolled	Winter	Spring	Summer	Fall
Fine Art	12	52	...	118
Applied Art.....	154	92	131	95
1922				
	Winter	Spring	Summer	
Fine Art	37	80	..	
Applied Art	177	85	95	

In addition to the above work the teaching staff, during 1921, taught the courses in Mechanical Drawing, Textiles and Clothing 5a and 5b, Household Administration 11a and 11b, and English 21, all courses closely related to Art.

During the past biennium two departments were involved and the work done by two professors and one instructor. Beginning with the current year the two departments were combined under one name and a professor and assistant professor employed to replace the two professors and instructor. Financial circumstances compelled such a change, but in releasing two of the former instructors and employing a man of greater versatility the work was not seriously weakened. It has, however, increased the teaching load of the present staff materially, being necessary for them to carry loads more than a third in excess of the supposed maximum. This has in part been due to the increased registration this year. In addition the departmental staff is conducting an extension class in Ogden and directing a number of correspondence courses. A marked increase would be noted here I feel sure, if we had time to give more attention to the work.

During the past two years the department has conducted eight public exhibitions of fine and applied art through the co-operation of the American Federation of Art and local artists and organizations. This, we feel, is a real community service and should, if possible, be increased for the future. Thirty-five public lectures on art subjects were given during the biennium in co-operation with the Extension Division and local organizations. Six magazine

articles were also published. There is constant demand for more of this work, but time does not permit.

We appreciate the co-operation of the other departments of the Institution doing related work, and hope, if possible, to establish such relations with all. The fundamental work of Costume Design and Home Furnishing has received better support than ever before, but while the work as given is as vital and practical as we can make it with present facilities, much more could be done with added financial aid. We are hoping that library facilities in Costume History and Design can be materially increased soon, as our work is very much handicapped at present.

We should likewise continue to add to our demonstration materials in Interior Decoration and to our supply of casts, as more and more strictly professional training is being called for.

Below is a summarized statement of the probable needs of the department for the coming year:

To relieve present teaching load, an assistant or student help.

For supplies	\$300
For exhibition fund	300
For repairs, payroll, etc.	75
Additions to Demonstration Material.....	75
Additions to casts and Equipment	100
To Prints, Photographs, etc. of art objects...	50
Total	<u>\$900</u>

Respectfully submitted,

CALVIN FLETCHER,

Professor of Art.

DEPARTMENT OF BACTERIOLOGY AND PHYSIOLOGICAL CHEMISTRY

To the President of the College:

Sir: I have the honor to report herewith the Department of Bacteriology and Physiological Chemistry for the past biennium.

The courses given by the department, with the number of students in each, are listed below:

	1920-21	1921-22	1922-23
Agricultural Bacteriology	38	46	35
Household Bacteriology	33	36	Winter
School Sanitation	21	Not given	Winter and Spring
Soil Bacteriology			8
Dairy Bacteriology	8	12	Winter
Sanitation	15	35	Winter and Spring
Sanitation (Statistics)		2	
Physiological Chemistry	7	15	Spring
Advanced Bio-chemistry	6	7	Not given
Research	2	1	2

The greatest number of courses in this department for 1922-1923 are listed for winter and spring. Although there has been a steady increase in the number of students taking work in the department, yet this year will find many more than ever before.

A number of the advanced courses, and even so vital a course as school hygiene, were not given last year and cannot be given this year, due to a lack of help in the department. We are teaching the work in bacteriology, physiological chemistry, and physiology, yet both myself and Professor Carter are half time College and half time Station. Either subject, as it is being called for at the present time, would require more than half time from one instructor.

The increasing demand for work in household bacteriology, sanitation and school hygiene makes it imperative that there be another full time assistant added to the teaching force of the department next year if the work is to be properly done. Moreover this would be a more economical arrangement, for as it is at the present time the head of the department must do much routine work,

such as tending store room, grading papers and the like. I therefore strongly urge that a full time assistant be given to the department next year. This would make it possible for us to properly take care of the Summer School teaching, which in the past has been woefully neglected.

The necessary supplies for the number of students who are registered in bacteriology cannot be purchased for less than \$1,000.00. An appropriation less than this to the department yearly means that even more of the necessary laboratory work must be eliminated than has been done during the past biennium.

The number of students taking work in bacteriology has more than doubled since I took over the work in 1913, yet we own only five more microscopes than at that date, which necessitates at times the assigning of one microscope to three or four students. I therefore strongly recommend that we secure an appropriation of \$1,500.00 for the purchase of microscopes.

Respectfully submitted,

J. E. GREAVES,

Professor of Bacteriology and
Physiological Chemistry.

DEPARTMENT OF BOTANY

To the President of the College:

Sir: I have the honor to report herewith the work of the Botany Department for the last biennium, on the basis of past performance, in which we are attempting to explain something of our future needs.

The Botany Department in 1920-21 gave 15 quarter courses to 237 students. The credit for these 15 courses was 60 hours, of which 25 were laboratory credits and 35 class room credits. In 1921-22, it taught 16 quarter courses to 269 students, with 62 quarter hours, of which 29 were laboratory credits and 33 class room credits. In 1920-21, the teaching personnel consisted of one man at one-third time and two men at one-half time each. Since the 60 hours represent three-quarters of teaching work and the personnel amounted to the full time of one and one-third men, the teaching load per quarter in 1920-21 equates itself to 15 credit hours per man. In 1921-22, the teaching personnel consisted of two men on one-third time, and one man on one-half time, and a student assistant on one-half time. For the year 1922-23, on account of the financial stringency we are attempting to get along with two men at one-third time each, and one man at one-half time, but our teaching load is so heavy that we are neglecting other work of the Institution to do the teaching. The enrollment this year in botany and the number of classes called for is greater than ever before and we are very much in need of more teaching help. Some courses which are in demand cannot be given because of insufficient help. We need a laboratory assistant.

No course in botany can be taught adequately without a constant supply of growing plants, consequently for our teaching work we need a greenhouse in which students can come in contact with and do laboratory work in growing plants under normal or nearly normal growing conditions. We also need an aquarium, connections for which are already in the laboratory.

The department is very much handicapped on account of inadequate library facilities. It is impossible for instructors to keep up to date in their work, or for students to do the essential reference work with the books and magazines at hand.

For our experimental work, the Botany Department is in crying need of a greenhouse. Years of delay could be avoided if we had a place to keep the work with destructive pests going on continuously instead of having it interrupted and lost at frost time. The Plant Industry Building has not been completed. We are handicapped in our instructional work as well as our experimental work, because of the fact that sinks are not connected. We have no hot water. Gas lines have not been connected. When the foundation of the building was laid, arrangements were made for a cold storage plant, one compartment of which could maintain zero temperature and two compartments of which could maintain temperatures above the freezing point. When the refrigerating plant for the Livestock Building was installed part of the funds for the equipment of the Plant Industry Building were expended to get a large refrigeration plant to handle both places, and a ten-ton plant, capable of all the refrigeration needed in both buildings has been installed. A small appropriation to connect the Plant Industry Building with the Livestock Building and to insulate our cold storage rooms would make available these much needed rooms.

Respectfully submitted,

GEORGE R. HILL, JR.,

Professor of Botany.

DEPARTMENT OF BUSINESS ADMINISTRATION

To the President of the College:

Sir: I have the honor to report herewith the Department of Business Administration for the past biennium.

When the report for the years 1919-20 was made this department had just been created. Since then interest in this kind of training has increased rapidly. At the present time some of the classes are so large that the most effective work cannot be done. This situation and the fact that we are not now able to offer many courses that would be very profitable in this field make it almost imperative that additional help be secured if this work is to develop as it should. I am, therefore, recommending that an additional instructor be added to this department at the earliest opportunity. At the present time there is only the department head who is giving more than half of his time to the work of other departments.

The following courses are offered this year:

Vocational Courses

Economics of Business

Junior College Courses

Principles of Business

Credits and Collections

Senior College Courses

Approach to Business Problems

Business Finance

Labor Management

Principles of Investment

Business Forecasting.

Some of these courses are rotated with others offered in alternate years, but this is practically impossible where classes are large.

Aside from the need for an additional instructor, already indicated, this department will require about one hundred dollars per annum to pay for a number of business services that have become almost indispensable, in some of our courses.

Respectfully submitted,

W. L. WANLASS,

Professor of Business Administration.

DEPARTMENT OF CHEMISTRY

To the President of the College:

Sir: I have the honor to report herewith the Department of Chemistry for the past biennium.

We are commencing what appears to be one of the most satisfactory years, as far as the Chemistry Department is concerned. Our present enrollment is greater than we have ever had before.

The department has been materially strengthened by the addition to the staff of Dr. Sherwin Maeser, his services having commenced on July 1, 1921. This gives us three faculty members in the department.

At the present writing considerable concern is felt regarding the ability of the department to handle the students who will register in the Winter Quarter. The department has been crowded to its capacity to handle the students registering in chemistry during the past biennium, and our registration in Inorganic Chemistry this fall is double the fall registration in the same work last year. During the Winter Quarter of last year we had ninety-four entering students in Inorganic Chemistry. To date this quarter we have 123 students registered in this work. If our winter enrollment would be as large as last year it would be impossible to take care of them without additional laboratory help. Previous years we have been able to expand the inorganic classes into the organic laboratory, but our present enrollment in organic chemistry will not permit of this expansion this year.

It is therefore recommended that two additional laboratory desks be added to the inorganic laboratory, also that a portion of the organic laboratory be partitioned off for a solution and auxiliary storeroom. The large enrollment of students makes it impossible to adequately distribute their supplies and chemicals from one storeroom.

We are also in need of a balance room in which the analytical balances can be kept and weighing done. For careful work it is imperative that a room be free from laboratory fumes if it is to be used for analytical weighings. Another much needed addition to the department would be a small preparation room for the

preparation of material for lecture demonstrations. This should be attached to or in close proximity to the lecture room.

During the past biennium samples of various materials have been received by the department for analysis. Some of these have come from other departments connected with the Institution. It is recommended that to meet the need of this type of work funds be provided, either in the Experiment Station or College, to enable the performance of this type of analytical work.

Respectfully submitted,

REUBEN L. HILL,
Professor of Chemistry.

DEPARTMENT OF DAIRY HUSBANDRY

To the President of the College:

Sir: I have the honor to submit herewith the report of the Dairy Husbandry Department for the past biennium.

The Department of Dairy Husbandry wishes to express its appreciation of the allowances for the past two years. The appropriations by the Legislature enabled us to add to our equipment for dairy manufacturing work and to buy cows and bulls to add to our dairy herds.

With Professor Wilster giving full time in Dairy Manufacturing we have been able to add much needed courses mentioned in the last report.

At present we are offering seventeen courses in dairying. So far we have registered students in 16 of these courses. We need to give more work in dairy production, which will be possible in the future when I am relieved of some of the general animal husbandry work.

Course		Fall	1920-21		Spring	Summer	Instructor
			Winter				
Dairy 1			14		8		G. B. Caine
Dairy a			14		8		G. B. Caine
Dairy 3					13		G. B. Caine
Dairy 4	(Buttermaking)				3		C. Christensen
Dairy 1	(Elements of Dairying)	13	1921-22		18	6	G. Wilster
			Fall	Winter			
Dairy 6		3					G. Wilster
Dairy 5			7		1	1	G. Wilster
Dairy 2			6				G. Wilster
Dairy 3					5		G. Wilster
Dairy 4					8		G. Wilster
Dairy 10					8	2	G. B. Caine

(Both instructors gave lectures and laboratory work to the high school instructors in Smith-Hughes work for three weeks during the Summer Quarter of 1922).

The operation of the creamery is progressing quite satisfactorily and we are able to give excellent laboratory work to the advanced students in dairy manufacturing. The annual audit by the State showed a little deficit against the creamery in July. This has been overcome and with normal conditions prevailing the commercial work of the department can be handled successfully. Buying and selling products necessary for the commercial work takes considerable time from the men in the department. To help with that work we employ at odd

times, five students that earn enough to pay most of their school expenses.

Both members of the department are doing some Extension work as the demand comes from the Extension Division. I am teaching and supervising the dairy work at the Practice Farm No. 2. That takes considerable time.

The official testing work of the State that has been turned over to me also requires considerable office time and occasionally trips over the State to see the breeders that are conducting official tests. We will need half-time of a man in the department to handle this work. The record work of the herds and the milk patrons along with the accounts handled, takes many hours each week from both men in the department.

During the past year we have completed some official testing work at the College Barn. We now have the two highest producing Holsteins in the State. This official testing work on our own herd must be carried on from year to year in order that we may keep up with the private breeders of the State. We now have the Holstein breeders looking to us, and with a little extra effort we can continue in a high rank. Our dairy herd is increasing better than ever before and in a short time we will be able to sell more animals, and thus will materially help our work. Unless we can make a satisfactory exchange with some breeder of the State, we should buy another Holstein bull next year. In order to get a bull that will improve our herd, we will have to pay approximately \$1,000.

As mentioned in a report of July, 1922, we shall have to connect our work with other departments or have a part time man to work with us. Bacteriology and chemistry are two subjects that must be taught in connection with dairying. We have a partial working agreement with those departments now, but they are already so crowded with work that it is hard for them to give us much time. We shall also need the assistance of the Department of Engineering and the Department of Marketing for some of our advanced dairy students.

The department has done practically nothing in experimental work in the past. That work is absolutely necessary for the development of our department. The people of the State are demanding information on dairy problems that must be solved.

The present Director of the Experiment Station has requested that projects be outlined. These are now under consideration and some work should be started soon. For this experimental work some new equipment will be necessary.

The following equipment is necessary for the development of the department:

Necessary Equipment for This Year

One Holstein Bull	\$1,000.00
One Wash Sink connected with steam	30.00
One Elevator	300.00
Various kinds of glassware for testing, etc..	25.00
Fifty Sample bottles	17.00
Connecting steam tester	15.00
Ice crusher	90.00
Connections from ice plant to ice cream room	200.00
One Simpson butter cutter	125.00

Equipment Necessary for Future Work

One Starter can	25.00
One Homogenizer	1,000.00
Market milk equipment	2,500.00
Equipment for modern milk room	1,000.00

Respectfully submitted,

GEORGE B. CAINE,
Professor of Dairy Husbandry.

DEPARTMENT OF ECONOMICS

To the President of the College:

Sir: I have the honor to submit herewith a report of the Department of Economics for the past biennium.

During this period there has been a general readjustment of courses and departments in the School of Commerce. Some courses previously found under this department are now listed under the Departments of Farm Management, Marketing, and Business Administration. On the other hand the Department of Finance and Banking has been merged with the Department of Economics.

From the following tables a consistent healthy growth is indicated:

Number of Students

1920-21

	Fall	Winter	Spring
General Economics	114	120	84
Principles of Econ. (Adv.) .....	..	23	14
Agricultural Economics .....	..	13	..
Labor Problems	13	..	..
Money	21	..	..
Banking .....	..	29	..
Co-operative Finance .....	..	..	12
Public Finance	10	..	..
Taxation .....	..	13	..
Economic History of United States...	..	13	..
	<hr/> 158	<hr/> 211	<hr/> 110

1921-22

Economics, Vocational	6	17	..
Principals of Economics	155	136	115
Principals of Economics (Adv.) .....	..	21	19
Economic Division of the U. S. ....	..	12	12
Labor Problems .....	..	..	6
Money and Banking	11	16	..
Banking Practice .....	..	..	8
Public Finance	4	..	..
Taxation .....	..	16	..
Commerce and Commercial Policy ...	5	..	..
Current Economic Prob. (Seminar) ..	12	..	..
	<hr/> 190	<hr/> 230	<hr/> 172

1922-23

Economics, Elementary	18	..	..
Economics, General	158	..	..
Current Economic & Political problems	41	..	..
Commerce and Commercial Policy ...	7	..	..
Current Economic Prob. (Seminar) ..	12	..	..
		<hr/>	<hr/>
	226		

In addition the following courses will be given during the year:

Economic Development of the United States
 Labor Problems
 Principles of Taxation
 Money and Credit
 Banking
 Banking Practice

The department has also conducted the following courses in Sociology:

1. Rural Sociology—which prepares for rural leadership.
2. Principles of Sociology.
3. Modern Social Problems.

During the past biennium the practice of visiting the State pathological institutions—Industrial School, Penitentiary, Insane Asylum, etc. for intensive study and observation has been advantageously instituted.

Needs

The growing desire for economic training demands improved facilities—maps, charts, statistical service, etc. It is the aim of the department to make the courses as practical as possible. For the work in Sociology \$200 per annum is sorely needed for the purpose of making studies of rural life in Utah with the aim of devising plans and means of furthering and advancing rural social organization.

Respectfully submitted,

M. H. HARRIS,
 Professor of Economics.

DEPARTMENT OF EDUCATION

To the President of the College:

Sir: I have the honor to report herewith the Department of Education for the past biennium.

To establish proper relations between the State of Utah and the Federal Government in vocational education the Legislature of 1921 passed an act enabling the Utah Agricultural College to organize a Department of Education. Acting under the authority of this legislation a department was established, in the School of General Science, which began its work in the Fall Quarter of the year 1921-22.

The funds for the maintenance of this department came partly from the Federal Government, Smith-Hughes Teacher Training fund, and partly from State funds.

A teaching staff for this new department was appointed, consisting of one full-time and two part-time teachers. These have done the work in psychology, principles and methods of teaching, and teacher-training required by the contract or understanding between the Federal Government and the State of Utah.

Facilities for practice teaching were arranged with the Logan school system. The two part-time teachers mentioned above spend part of their time in the Logan High School. They were engaged jointly by the U. A. C. and the Logan Board of Education to teach Agriculture and Home Economics in the High School, and methods of teaching those branches in the College, and to direct the practice teaching of Smith-Hughes students of the College.

After the first year of teacher-training work the College graduated twenty-nine students, fifteen women and fourteen men, who had met Smith-Hughes requirements and were certificated to teach Agriculture and Home Economics as subsidized by the government. These students are now teaching those practical studies in this or adjoining states.

To give a more specific view of the activities of the department in teaching the professional studies to those who graduated, and to other prospective teachers, the following figures are given:

	Fall	Winter	Spring
Introductory Psychology	43	71	18
Rural Education		28	14
History of Education	39	50	53

	Fall	Winter	Spring
Principles of Psychology	43	..	..
Physical Development .....	..	30	30
Principles of Education.....	19	..	..
Psychology of Adolescence .....	..	41	..
Educational Psychology .....	..	..	43
Methods of Teaching Agriculture ....	..	12	..
Methods of Teaching Home Economics ..	..	13	..

The course in Rural Education given during the Winter Quarter was designed especially to prepare students for high school teaching; during the Spring Quarter it was especially adapted to those preparing to become County Agents. In connection with the courses in Methods of Teaching Agriculture and Home Economics, apprentice teaching in the public schools of the city was required.

This makes a total for the respective quarters as follows: Fall 200, Winter 215, Spring 153, who were pursuing educational studies with a view to entering the teaching profession. When it is borne in mind that Utah has yet large numbers of teachers who have not adequate preparation, the establishment of this Department is seen to be fully justified.

Extension classes for teachers in service were also conducted in Brigham City and Garland by the staff of the department. In the former place there were 54, in the latter 29, enrolled.

The above brief report and survey of classes show some of our needs. With the large enrollment and increasing demand for professional educational branches we need an additional teacher. If we can pull through this "year of the narrows" we should have more help for next year. We need better library facilities. The library is in a large measure our laboratory. It should have the best and most recent literature, and of the most used books for large classes we should have several copies.

We need to have additional strength of staff for Summer Quarter work. Many teachers are then at liberty and will come and study for higher degrees and better certification if right facilities are offered.

Respectfully submitted,

HENRY PETERSON,

Professor of Education.

DEPARTMENT OF ENGLISH

To the President of the College:

Sir: I have the honor to report herewith the Department of English for the past biennium.

The work of the department is proceeding in accordance with the arrangements made by Professor N. A. Pedersen, now on sabbatical leave. The general problems and needs of the department have been stated in past reports which Professor Pedersen has submitted. It is unnecessary for me to repeat them. Many of the needs do not, in view of our financial limitation, call for immediate action. They should nevertheless be borne in mind. For example, it should be a deliberate policy of the College that the English section of the Library shall at all times receive as liberal accessions as the funds of the College will permit.

One need, however, has become somewhat pressing and by next year may prove imperative. It is the need for an additional instructor. It has arisen from two causes.

First, the number of the students of English is constantly increasing. To be sure, we have now fewer enrollments than formerly in the vocational courses. But the decline in this branch of our work has been more than offset by gains elsewhere. During the present quarter we have had to provide for two more sections of Freshman Composition than we had planned. Next quarter we may have to provide for yet another section. Next year, if our numbers continue to grow, we should have two sections rather than one of College Grammar and two rather than one of Advanced Writing. Furthermore—though this is a matter of curriculum as of numbers—there is an appreciable demand that one more elective course be offered in Junior College literature.

Secondly, we should, even if our enrollment remained stationary, do more intensive work in certain classes than is now possible. The Junior College classes in literature should not be really large; for if they are, each student can have but few chances to recite—and he is too immature to derive the full benefit from lectures. In composition classes, whether Junior or Senior College, a restriction of membership is even more important; for without painstaking

ing individual criticism the efforts of students are in great part wasted. At present our Junior College literature classes and both our Junior and our Senior College composition classes are, with few or no exceptions, too large.

It seems clear therefore that, if normal growth be anticipated for the department, an additional full-time instructor in English should be appointed for next year. His main task would be to relieve the congestion in the Junior College, especially in composition. But his assignment to Junior College work should not mean that less care be taken as to his qualifications. The training of our students in the details of composition and grammar must fall almost wholly in the first two years. The training should be all the more thorough because many of our students will later become teachers of these subjects in the public schools of the State. Hence the new instructor in the department should be the most competent we are able to secure.

Respectfully submitted,

GARLAND GREEVER,

Professor of English,
Acting Head of the Department.

DEPARTMENT OF FARM MACHINERY

To the President of the College:

Sir: I have the honor to report herewith the Department of Farm Machinery and Automobile Work for the past biennium.

During the past two years the department has been devoted almost entirely to the vocational training of disabled war veterans, and since we expect this work to decrease rapidly in the near future we are now re-arranging our courses so as to be able to give to the regular college students the much needed work in general farm mechanics.

After making a careful survey of the conditions of farm machinery now being used on the farms we find that it is now costing the farmers a great deal of money for replacements and repairs on their equipment. This amount may be reduced to a minimum if the proper care and attention be given to the machinery and parts of machines that are giving the trouble, so in an effort to equip the department so as to be in a better position to serve the greatest possible number of people, we are preparing to give more of the work in general farm mechanics.

In addition to our regular students in farm mechanics, the state director of Smith-Huges work in the high schools is requesting that we give a course in General Farm Mechanics and Farm Machinery for the high school teachers only, and since this department has devoted the major portion of the last five years to the training of specialists in the vocations, we are not adequately equipped to teach all of the work in farm machinery now in demand. Therefore we recommend that a small additional appropriation be made to purchase some farm implements and parts of implements to make possible the teaching of more complete courses in this work.

Respectfully submitted,

A. H. POWELL,

Associate Professor of Farm Machinery.

DEPARTMENT OF FARM PRACTICE

To the President of the College:

Sir: I have the honor to report herewith the work of the Farm Practice Department for the past biennium.

The Farm Practice Department has been a part of the College for eleven months. It was created primarily to give agricultural training to Federal men in accordance with the plans of rehabilitation of the Federal Government.

The units of the department are as follows: Practice Farm No. 1, comprising 209 acres used for the courses in Beef Production, Hog Production, Poultry Production, Sheep Production, Horse Management, Crops and Soils, Farm Management, and Irrigation; Practice Farm No. 2, comprising 100 acres, used for the courses in Dairy Production, Horticulture, including Tree Fruits and Bush Fruits, Truck Gardening and Landscape Gardening; the U. A. C. Campus used for the courses in advanced Dairy Production, Advanced Poultry Production, and Dairy Manufacture; the Cache National Forest used for courses in Beef Production and Range Management.

The courses given are elective to the men, who may major in General Livestock, in Dairy and Poultry, in Horticulture, or in Crops and Soils. The men spend three months continuously in the department, working the while on one of the above named majors. In each major there are six courses, each of which require two weeks to complete. This arrangement makes it so that each man completes six courses in each quarter, for which fifteen credits are given.

The daily work program of the men is as follows:

- 8:00 A. M.—Truck arrives with men.
- 8:00 to 11 A. M.—Work in their courses as lined up on their daily cards. Each group has a 30-minute class period with his supervisor.
- 11:00 A. M.—Lecture by one of the heads of the College departments.
- 12:00 M. —Noon.
- 12:50 P. M.—Estimating contest (Wt. of farm animals, etc.)

1:00 P. M.—Work.

3:45 P. M.—Discussions of work for following day and filling in daily cards.

4:00 P. M.—Truck for home.

The lecture class at 11:00 A. M. daily is conducted by one of the department heads of the College. Six different department heads, the best qualified men at the College, are therefore at the Farms for consultation and instruction each week. The periods are taken up principally with questions and discussions on problems that have come up in the daily work of the men.

On Saturday of each week a round-table discussion of the various farm activities and problems is held, at which reports by each group are given in their respective lines of work.

The daily class recitation by each group on a text assignment in their various lines, is the harmonizer between the theoretical and the practical.

The department is doing considerable work in the field of experimentation and investigation. The range cattle weighing project is the only one of its kind ever recorded. The 154 head of range cattle which are fed winters and run on the Cache National Forest summers, are all tagged and numbered. Each animal has a record card upon which is noted the number, sex, age, markings, and quality. Twice each year, Spring and Fall, every animal is weighed and its weight recorded. From this record the winter and summer gains or losses on all classes, ages, and breeds is readily seen. A horse feeding experiment is being run, which will determine the relative amounts of hay and grain which farm work horses should consume. Each department, such as cattle, horses, hogs, sheep, poultry, dairy, fruit, truck and crops, maintains a cost account, in which all weights of feed consumed, purchases, and sales, etc., are recorded. A crop record of each piece of land on the Farm is also maintained.

A special feature of the work is the Summer Encampment on the Cache National Forest. In co-operation with the U. S. Forest Department the Practice Farm Department conducts a two weeks school at the Tony Grove Ranger Station in Logan Canyon. Courses in Range Management, Forestry, and Range vegetation are given under the supervision of the most able instructors obtain-

able. At the 1922 Camp the following teaching force was present: Dr. A. W. Sampson, Director of the U. S. Forest Service Experiment Station at Ephraim; Dr. G. B. Baker, in charge of Sylviculture, U. S. Forest Service, District No. 4, Ogden; D. A. Shoemaker, in charge of Grazing Studies, U. S. Forest Service, District No. 4, Ogden; Supervisor C. B. Arentson of the Cache National Forest, assisted by Forest Rangers Rice, Christensen, and Smith; Dr. Stephenson, State Veterinarian; and by Dr. George R. Hill, Jr., Prof. Ray Becraft, Dr. H. J. Fredrick, and Prof. George B. Caine, of the U. A. C.

The Farm Practice Department furnished 16 saddle horses for making the daily field trips for investigation and study. Twenty-four Federal students took the courses.

The Farm Practice Department furnishes working supervisors in all the various branches as follows:

Beef, Cattle, Sheep, Horses	Clyde W. Lindsay, Farm Supt.
Hogs, Poultry	George Ritchie
Dairy and Truck Garden	Warren Schow (3 months)
Irrigation	W. T. Cannon
Horticulture	Frank Harmon (3 months)
Crops	Bert Burrell

These men are responsible for the instructional work given the students, also for the farm work in their various lines.

The following number of students have been enrolled:

Winter Quarter 1921-22	12
Spring Quarter 1922	20
Summer Quarter 1922.....	16
Fall Quarter 1922.....	20
、 Total	<hr/> 68

Of these men 75 per cent have made a success of their work, and are friends of the department.

The farms have produced fair yields during the growing season of 1922. Following is from the Farm crop records:

Crop	Acres	Total Yield	Yield per acre
Wheat	6	272 bu.	45 bu.
Oats	20.67	1,140 bu.	71 bu.
Barley	16	848 bu.	53 bu.
Peas	5	10,000 lbs.	2,000 lbs.
Potatoes	2.16	1,144.5 bu.	532 bu.
Timothy and Clover...	18	60 tons	3 ½ tons
Wild Hay	100	103 tons	1 ton
Apples	10	2,000 bu.	200 bu.
Pasture	66	Used by dairy stock, Horses and Hogs	
Peaches, Apricots and Plums	10	none	none
Truck Garden and Berries	5	\$ 250	\$ 50
Silage Corn	5	75 tons	15 tons
Alfalfa	46	89 tons	2 tons

The following livestock are at present on the Farms:

Range Cattle	152
Hogs	99
Work Horses	14
Saddles Horses	2
Poultry	230
Dairy Animals	23
Lambs	364

The department is conducted on strictly business lines. Considerable equipment and improvements have been necessary to accommodate the instructional work.

The future of the department looks encouraging, especially with the necessary support given it by the Veterans' Bureau. The success of the work makes necessary a close co-operation between the College and the Rehabilitation officials.

Respectfully submitted,

CLYDE W. LINDSAY,

Head of Farm Practice Department.

Approved:

George R. Hill, Jr.,

Dean of the School of Agriculture.

DEPARTMENT OF FOODS AND DIETETICS

To the President of the College:

Sir: I have the honor to report herewith the Department of Foods and Dietetics for the past biennium.

1. Registration in the courses offered by the department:

Courses	No.	Credit	Number of Students Registered									
			1920-21			1921-22						
			S.	S.	Fall	Wtr.	Spr.	S.	S.	Fall	Wtr.	Spr.
Food for Family	Foods a & I..	3	..	..	8	..	3	..	4	..	..	..
Food Economics	Foods II	12	..	..	33	33	32	..	24	23	23	23
Dietetics	Foods IV	10	..	..	..	12	12	..	..	15	15	15
Food Engineering	Foods V	4	4	15	..	..	5	14	..	..	..	..
Special Dietetics	Foods III	3	2	..	..	..	..	..	..	..	..	..
Food Problems	Foods X	earned	..	..	..	..	..	1	1	4	..	..
Total....		..	6	48	53	44	8	39	43	42	..	..

Three interesting facts are disclosed by the above figures:

I. There has been a decided decrease in the number of applicants for work of vocational grade. This suggests that the end of this type of service has been very closely approached if not reached.

II. Improvement in the working facilities for this department, particularly in the control of store-room temperature and provision of adequate fuel for our first floor laboratory, has greatly aided our work. Appropriation for the coming biennium of a sum not less than that for the past, should be sufficient for the upkeep of equipment and maintenance of highest standards of work.

III. In order to make this department of greater service to the whole student body a foods course for men might be developed.

The definite and increasing demand for advanced work calls for an addition to the staff of a woman thoroughly trained in Home Economics, and especially adapted to the task of directing Home Economics students research work, and in which work the Foods and Dietetics Department wishes to share.

Respectfully submitted,

JESSIE WHITACRE,

Professor of Foods and Dietetics.

DEPARTMENT OF FORGING

To the President of the College:

Sir: I have the honor to report herewith the Department of Forging for the past biennium.

The work of the Forging Department during the last two years has been quite successful. The major part of our work is to teach forging to tractor, automobile, ignition, machine, and agricultural students, keeping in mind the part forging will have in each of these lines of work. There are also a number of students taking forging to become blacksmiths. This makes the teaching rather difficult, due to the fact that this work has to dovetail in with the courses of other departments.

It is our policy to change the work to suit the varying conditions. This year a special course will be given for agriculture students who have but little time to spend in the shop.

The numbers in forge work during the Fall, Spring and Summer Quarters were about 35. In the Winter Quarter the numbers were much higher, reaching 109 students.

Although the Forge Shop is fairly equipped for present needs, I feel the need of a special furnace for the heat treatment of various alloy steels, which are used in the automobile, tractor, and farm implements. The steels cannot be treated satisfactorily in the forge. I wish to recommend the purchase of an electric furnace for this work, which may be used by all departments of the School of Mechanic Arts.

Respectfully submitted,

ROY EGBERT,

Assistant Professor of Forging.

DEPARTMENT OF GEOLOGY

To the President of the College:

Sir: I have the honor to report herewith the Department of Geology for the past biennium.

During the summer of 1920 I was on leave of absence for three months and devoted the time extensively to the survey and valuation of non-metalliferous lands for the State. Areas surveyed were carefully mapped and data written up complete. This material is on file in the office of the State Board of Equalization.

During the school year of 1920-21 the teaching schedule was very heavy. Courses were given in general Geology, Economic Geology, Mineralogy, Agricultural Geology, Geology of Ground Water, and one course in Roads.

Again, in the summer of 1921, three months' leave of absence was granted and the work was given to State geology, most of the time being spent on the coal survey of Carbon and Emery Counties. Mr. D. S. Carder of the Oregon Agricultural College was employed at this time as an assistant in the department.

During the school year of 1921-22 the following courses in Geology were given: Physiography, General Geology (2 sections), Economic Geology, Mineralogy, Agricultural Geology, Engineering Geology, Geology of Groundwater.

Mr. Carder carried an extra course in General Astronomy, and I carried a course for one term in the Maintenance of Roads.

During the first part of the Summer Quarter, 1922, I gave a course in Human Geography.

On September 1, 1921, I took over the responsibility of the directorship of the Experiment Station. In addition to this, however, I have been carrying a teaching load of from six to eleven hours, and Mr. Carder has had a load equal to about sixteen hours.

Through the assistance of Mr. Carder the Geology Museum has been carefully worked over and most of the material is sorted and labeled. Everything in the department is in splendid condition.

During the field work in the State during the past year we have been able to collect some very fine specimens representing the mineral fertilizer industry of the State. These make a valuable addition to our collection, especially in connection with the work in Agricultural Geology.

The cases in the laboratory should be provided with doors to make valuable specimens more secure. There have been lost from the department some rare specimens of minerals of rather high value.

For supplies, adding the necessary equipment to better protect the material we now have on hand, \$450 should be provided as a budget for the next biennium.

Respectfully submitted,

WILLIAM PETERSON,

Professor of Geology.

DEPARTMENT OF HISTORY

To the President of the College:

Sir: I have the honor to report herewith the Department of History for the past biennium.

During the year 1920-21, eighteen courses in History and ten in Political Science were given. There were registered in the department 205 students in the Fall Quarter, 194 in the Winter, 123 in the Spring, and 120 in the Summer.

In the year 1921-1922 eleven courses in History and twelve in Political Science were taught. There were enrolled in the department 173 students in the Fall Quarter, 217 in the Winter, and 237 in the Spring.

The courses offered have as their purpose training for better citizenship. To attain this, an understanding of the ideals of humanity and a knowledge of the form and functions of our Republic are emphasized.

As it is essential for students to acquire a broad outlook, a greater number of magazines and a larger collection of volumes devoted to history should be procured. The aid already given is much appreciated.

Respectfully submitted,

JOEL E. RICKS,

Professor of History.

DEPARTMENT OF HORTICULTURE

To the President of the College:

Sir: I have the honor to report herewith the Department of Horticulture for the past biennium.

Courses Given by the Department of Horticulture
School Year 1920-21

Type and No. of Course	Name of Course	Enrollment			Instructor
		Fall	Winter	Spring	
VOCATIONAL					
A	Fruit Growing in the West.....	14	..	..	M. C. Merrill
B	Practical Horticulture .....	..	14	..	T. H. Abell
JUNIOR COLLEGE					
1-A	Principles of Horticulture	7	..	..	M. C. Merrill
1-B	Horticultural Technique .....	..	11	..	T. H. Abell
2	Pomology	10	..	..	M. C. Merrill
4	Practical Pomology .....	..	..	4	T. H. Abell
5	Olericulture	2	..	..	T. H. Abell
7	Small Fruits .....	..	..	7	T. H. Abell
8	Landscape Gardening	3	..	..	T. H. Abell
SENIOR COLLEGE					
1	General Horticulture .....	..	..	10	M. C. Merrill
14	History of Cultivated Plants .....	..	10	..	M. C. Merrill
16	Seminar .....	..	1	1	M. C. Merrill
	Total	36	36	22	
	Grand Total			94	

Courses Given by the Department of Horticulture
School Year 1921-22

Type and No. of Course	Name of Course	Enrollment			Instructor
		Fall	Winter	Spring	
VOCATIONAL					
A	Fruit Growing in the West.....	10	..	..	M. C. Merrill Frank Harmon
B	Practical Horticulture .....	..	17	..	M. C. Merrill Frank Harmon
C	The Principles of the Garden.....	..	..	11	M. C. Merrill G. A. Backman
JUNIOR COLLEGE					
1-A	Principles of Horticulture	3	..	..	M. C. Merrill Frank Harmon
1-B	Horticultural Technique .....	..	9	..	M. C. Merrill Frank Harmon
1-C	Veg. and Landscape Gardening.....	..	..	7	M. C. Merrill G. A. Backman
2	Pomology	5	..	..	M. C. Merrill
5	Olericulture	5	..	..	M. C. Merrill Frank Harmon
7	Small Fruits .....	..	..	7	M. C. Merrill

SENIOR COLLEGE

1	General Horticulture .. .. .	..	..	25	M. C. Merrill
					G. A. Backman
10	Home Floriculture .. .. .	..	..	10	M. C. Merrill
					G. A. Backman
11	Systematic Pomology	5	..	..	M. C. Merrill
14	History of Cultivated Plants .. .. .	..	7	..	M. C. Merrill
16	Seminar	4	5	3	M. C. Merrill
17	Research	1	2	..	M. C. Merrill
	Total	33	40	63	
	Grand Total			136	

It will be noted that there has been a steady increase in the registration in the Department of Horticulture since 1916-17.

1916-17	48
1917-18	72
1918-19	27
1919-20	89
1920-21	94
1921-22	136

T. H. Abell, Assistant Professor of Horticulture, was given a year's leave of absence in 1921-22 for the purpose of further study in an eastern institution. On account of the large increase in registration Mr. Frank Harmon, a graduate student in horticulture, assisted in the laboratory instruction in the Fall and Winter Quarters of 1921-22. In the Spring Quarter he was transferred to the U. A. C. Practice Farm to take charge of the instructional work in horticulture. George A. Backman, a senior in horticulture, took his place in the department for the Spring Quarter.

Two of the very pleasing features of the instructional work was the increasing interest in horticulture shown by agricultural students specializing in other lines, and the majoring of several men in horticulture.

In order that the work of the department may keep pace with the growth in registration and demands of the horticultural industry of the State, certain human and physical equipment should be added to the department.

The present small collection of fruit trees is fast being destroyed by the encroachment of the College Campus. In order that a suitable collection of fruits be continuously available it is necessary that a new and larger plantation be immediately started to replace the old one. The U. A. C. Practice Farm No. 2, which has a commercial orchard, would be a desirable location for a new variety plantation.

A good barrel spray outfit is needed for instructional purposes.

Suitable laboratories are needed where the more technical instruction in horticulture may be given.

Modern fruit grading and packing equipment is needed, that students may learn how to put up first-class horticultural products.

Another trained instructor is needed in the department, since there is an increasing call for summer instruction in horticulture as well as an increase in fall, winter and spring registration. The lack of sufficient help will probably necessitate a reduction in the number of courses offered by the Department of Horticulture for the next school year, since the number of credits now offered total considerably higher than the maximum teaching load for one instructor.

An estimate of the funds needed for improvement and for instructional work of the department the next biennium is as follows:

Material, equipment and supplies for the regular instructional work	\$ 400.00
Barrel Sprayer	75.00
Laboratory equipment for new laboratories	200.00
Fruit trees, plants and planting	400.00
Payroll for graduate assistant on half time in case no full time assistant is secured.....	1,500.00
Total	<u>\$2,575.00</u>

Respectfully submitted,

TRACY H. ABELL,
Assistant Professor of Horticulture.

DEPARTMENT OF HOUSEHOLD ADMINISTRATION

To the President of the College:

Sir: I have the honor to submit herewith a report of the Household Administration Department covering the work of the past biennium.

Enrollment in Household Administration Department

	Cred.	No. of Students 1920-21	SS.	21-22	SS.
Personal Accounts	3	37	..	31	..
Home Health and Nursing	6	62	..	41	20
History of Domestic Architecture	3	10	..	Not given	..
History of Furniture.....	3	Not given	..	14	..
Home Furnishing	8	16	..	19	..
Mothercraft and Child Welfare	3	18	..	15	..
Literature for Children	3	Not given	..	40	..
Household Management	5	6	5	2	..
Household Accounts	4	9	..	7	..
Woman's Spending Problems	1½	..	..	..	6
Household Management Special	2½	..	17	..	..

The Household Administration Department has been strengthened and the standard work raised through:

1. The addition of a thoroughly trained woman with rare experience to teach the courses in Home Health and Nursing, and Mothercraft.

2. The equipment of a laboratory nicely adapted to the conduct of Home Health and Nursing course.

3. The acquisition of a laboratory for the Household Management course, which allows the students to carry out management projects comparable to typical family living.

4. Strict adherence to prerequisites for the Household Management course, which makes this course a final check whereby the students can measure their mastery of the technical subjects, and their power of using this knowledge.

The instructor in the Home Health and Nursing course points out that educational value of this course is greatly increased by practical teaching in the actual care of any and all students when sick, and their illness is such as can be treated in the Home Health and Nursing laboratory. In order to do this, however, either the instructor in the course must be allowed time for this work, or she must have associated with her a graduate nurse assistant.

The nursing laboratory was opened January 5, 1922. The following treatments to students and professors have been given:

January	26
February	46
March	36
April	22
May	24
June	6
July	3
September	2
October (to 26th)	47
<hr/>	
Total	212

The Head of the Department looks forward to the time when the Household Management laboratory can be a building owned by the College and supplied with a garden plot. This garden could do much toward making the Household Management Department self-supporting.

Respectfully submitted,

ALICE KEWLEY,

Assistant Professor of Household Administration.

DEPARTMENT OF IRRIGATION AND DRAINAGE

To the President of the College:

Sir: I have the honor to submit herewith a report of the work of the Irrigation and Drainage Department for the past biennium.

Courses and Students

The Irrigation and Drainage Department offers two courses for vocational students, practical farmers and watermasters, two courses of junior college grade, five for senior college students, and two for students doing graduate work. The graduate courses were added during the present school year. Irrigation problems in the State make these graduate courses a real necessity, and the Experiment Station activities of the department make it possible to direct the work of graduate students at a minimum expense.

The department offers three courses to correspondence students: namely, irrigation practice, hydraulics, and irrigation institutions.

Status of the Different Courses

The irrigation practice course for vocational students has been highly successful, but the value or need of the special course for watermasters is not yet reflected in the demand for the course. The few men who have registered have been highly pleased with the work.

The Junior College Irrigation Practice course is designed to meet the needs of students in agriculture and in agricultural engineering. The course has been given during the Fall Quarter and again during the Spring Quarter. It was given during the Summer Quarter of 1922, and should be given regularly during the Summer Quarters hereafter. During the calendar years 1921-1922 more than one hundred ten students have taken this course. The course in hydraulics has been gradually strengthened and will henceforth be accompanied by laboratory work.

In the Senior College group, the courses in Drainage Design and in Irrigation Design have been improved by giving increased attention to the field laboratory work.

The course in Irrigation Institutions, given jointly by the Departments of Irrigation and Political Science, is being strengthened. The Seminar course has made gratifying advancement.

The course in Management and Operation of Irrigation Systems, although in real demand by advanced students, has not yet been well developed.

Laboratory Facilities

The completion of the Soil and Water Relations Laboratory and the Water-Measurement Laboratory has made possible a decided improvement in the quality of practically all of the courses given. The department aims to make this improvement a reality at an early date.

Equipment for the Materials Demonstrations Laboratory is being received from various manufacturers without cost. This equipment will be housed in the Water-Measurement Laboratory.

Graduates

During the two years 1921-22 the School of Agricultural Engineering has graduated twelve students majoring in Irrigation and Drainage. It now appears that in the Class of 1923 there will be twelve majoring in Irrigation and Drainage, three of whom will receive the Master's Degree.

Needs

The most urgent laboratory needs of the department have now been met. Further needs in the order of their importance are:

- | | |
|--|------------|
| (1) Miscellaneous office supplies, equipment and traveling expense—two years..... | \$ 450.00 |
| (2) Stenographic and office help—two years. | 600.00 |
| (3) Supplies for Soil and Water Relations Laboratory | 150.00 |
| (4) An Agricultural Engineering library with special reference to recent works on irrigation and drainage— | |
| (a) Fixtures | \$300 |
| (b) 116 Volumes new books | 450 750.00 |
-

(5) The employment of an irrigation engineer to assist in instruction to college students and conduct research work—one-half time	1,000.00
(6) Purchase of a pump and motor to connect reservoirs in Water-Measurement Laboratory	500.00
Total	<u>\$3,450.00</u>

Outlook

The outlook for the department is very bright. The gradual return of normal industrial conditions will doubtless stimulate the present urgent demand for reclamation of additional western lands. Various groups of states in organized capacity, irrigation districts, county commissioners, and the Federal Government are all studying ways and means of increasing the area of irrigated land and of advancing irrigation interests.

The training of the necessary leaders to further these activities is one of the greatest opportunities before the College. Much has already been done. The work of the engineering graduates of the Institution is a most convincing evidence of its service in this connection. It is, however, quite as important to instruct a large number of the prospective farmers in the fundamental principles of irrigation as it is to train thoroughly a few leading irrigation engineers.

The aim of this department is to make it possible for every irrigator of the State to obtain a correct understanding of the elementary irrigation and drainage principles. It hopes to accomplish this (1) by giving a fundamental course in irrigation practice to a large number of college students, (2) by training specialists who, after leaving college, will work among the irrigators of Utah, (3) by giving short course resident instruction to practical irrigation men engaged in the management of irrigation enterprises, (4) by reaching in the field all of the irrigators possible under the direction of the Extension Division.

Respectfully submitted,

O. W. ISRAELSON,

Professor of Irrigation and Drainage.

DEPARTMENT OF MARKETING

To the President of the College:

Sir: I have the honor to report herewith the Department of Marketing for the past biennium.

In 1921 the Department of Marketing was enlarged to include all courses related to the field of selling. Thus courses in advertising and salesmanship were brought into the department.

As at present organized the department is prepared:

- (a) To give to students in agriculture training in the marketing of farm products and livestock.
- (b) To work with other departments in training managers of co-operative organizations.
- (c) To give to students in business training in the fundamentals of advertising and selling.
- (d) To give complete preparation for the fields of advertising and selling.

Dr. Wanlass has direct supervision of all courses having to do with the agricultural phase of marketing, while the writer has charge of the courses dealing directly with advertising and selling.

Both phases of the work have seen significant development during the past year. In answer to a strong demand, advanced courses have been organized in the writing of advertisements, the outlining of advertising campaigns, sales management, direct mail advertising, and advertising and sales problems. Also in response to definite requests on the part of students, the following graduate courses have been organized: Economics of Marketing; Marketing Problems; Seminar in Marketing. The introductory note to these graduate courses in the College Catalog outlines concisely their importance.

"Never before in the history of the United States has there been such widespread and intense interest in the subject of marketing. This is particularly true with reference to the marketing of farm products and livestock. The recently established Bureau of Markets is now the

largest subdivision of the Federal Department of Agriculture. Most of the States have established marketing agencies of various kinds. If these governmental agencies are to function properly, and if a better marketing system is to be envolved, there will be an ever-increasing need for men and women who are thoroughly trained in the economics of marketing."

Respectfully submitted,

D. E. ROBINSON,

Professor of Marketing.

DEPARTMENT OF MATHEMATICS

To the President of the College:

Sir: I have the honor to report herewith the Department of Mathematics for the past biennium.

The following table shows the class-room work conducted by the department, and is expressed in terms of "student credit hours" per quarter, and also in terms of "individual students attending" per quarter:

Student Credit Hours

	Vocational	College	Total
Fall, 1921-22	400	495	895
Winter, 1921-22	400	520	920
Spring, 1921-22	300	495	795
Summer, 1922	400	75	475
	<hr/>	<hr/>	<hr/>
Total, 1921-22	1500	1585	3085
Fall, 1922-23	375	560	935

Individual Students Attending

	Vocational	College	Total
Fall, 1921-22	80	150	230
Winter, 1921-22	80	155	235
Spring, 1921-22	60	150	210
Summer, 1922	80	15	95
	<hr/>	<hr/>	<hr/>
Total, 1921-22	300	470	770
Fall, 1922-23	75	170	245

The vocational work is offered primarily for the benefit of ex-service men taking training under the direction of the Federal Rehabilitation Board.

The collegiate work of the department is given by the writer with the aid of Mr. Howard McDonald, who is teaching 8 credit hours per quarter.

Your Professor of Mathematics serves also as Dean of General Science, Chairman on Graduation, Chairman of Schedule, and on the Committee on Graduate Work.

If the present heavy registration in the department continues, and there is every reason to believe that it will, we shall need the services of Mr. McDonald on full time next year.

Respectfully submitted,

A. H. SAXER,

Professor of Mathematics.

DEPARTMENT OF MACHINE WORK

To the President of the College:

Sir: I have the honor to report herewith the Department of Machine Work for the past biennium.

The last two years have been two years of changes in the Machine Work Department. During this time we have entirely changed the courses in machine work; trying as far as possible to put them on a production basis and do only jobs and operations that teach standard shop practice. We have been very successful in our attempt, and we have received some very complimentary remarks on our success, especially from government officials in charge of Soldier Rehabilitation work. We have bent a large part of our efforts toward making new equipment and putting all the old equipment in first-class shape. As a result of this effort, and the addition of several machines sent here by the Federal Government, we are glad to report to you that the machine shop is now in very good condition.

Our attendance has been restricted somewhat by our limited equipment. Most of the time we have had more students than we could properly train. We average about fifty students in the department, and we have had as many as eighty during the Winter Quarter. At present there are thirty-six students registered for machine work. I expect this number to be forty before the term is over, as students are still registering. We were asked, only a few days ago, if we had room for the training of more Federal students as machinists.

The Machine Work Department has a real need for some heat-treating equipment. We are behind the times in this respect, and not only that, but we are handicapped in our work. The last few years has developed metals for tool-making and machine construction that cannot be successfully worked in a forge fire. We have considered this matter years ago, but we were always discouraged by the fact that we did not have gas to operate a furnace. This difficulty is now overcome by the fact that there are on the market electric furnaces that are successful. In fact, both manufacturing firms and schools are taking out their gas furnaces and replacing them with the electric furnace. Even though this is a time for

economical administration, I feel that I should not be doing my duty as head of the Machine Work Department, if I did not ask for a special appropriation of \$800.00 to buy an electric furnace and some heat-treating equipment. We should be mindful of the fact that our State may soon become a metal producing state on a large scale, and a little beginning along the line of the study of heat treatment of metals will be a step well taken by a school that has in its charge the development of the mechanic arts of the State.

The regular expense of the department for the next two years will be about \$1,600.00, assuming that the attendance will remain the same as now. This will allow a little for additional small equipment and tools that the department needs, so as to keep up a steady improvement.

Respectfully submitted,

AARON NEWEY,
Associate Professor of Machine Work.

DEPARTMENT OF WOODWORK

To the President of the College:

Sir: I have the honor to report herewith the Department of Woodwork for the past biennium.

Enrollment

In the past two years, we have had 468 students. This is more than double the number compared with the same period two years ago. The registration of local students, in our last Winter Quarter, was noticeably small, owing to the rise in fee and scarcity of means. To make up for this, our last Summer Quarter was unusually large (51 students).

Federal Students

The work of the Federal men has a wide range, from all kinds of household articles, to anything used on the farm. Last winter, the students in bee culture, who also took woodwork, made for their own use hundreds of beehives.

Harness Repairing

This new work is growing, and if more time could be devoted the growth would be more rapid. Most of the equipment for this work, including all the stitching horses, has been made by the students in woodwork, who take harness work.

Suggestions

Since we are looking to the high schools for new students, would it not be profitable for the different shop departments to visit as many high schools as possible in order to become better acquainted with their wants?

Respectfully submitted,

A. J. HANSEN,

Associate Professor of Woodwork.

DEPARTMENT OF MILITARY SCIENCE AND TACTICS

To the President of the College:

Sir: I have the honor to submit herewith a report of the Department of Military Science and Tactics during the past biennium.

During the scholastic year, 1920-21, the maximum number of students enrolled in the department was 209 in the basic course, which comprises the two years military training required by law, and 17 in the advanced course, which comprises two years advanced military training to graduates of the basic course who so elect, and leads to a commission in the Reserve Forces of the United States Army.

During the scholastic year 1921-22, the maximum number of students enrolled in the basic course was 247 and 13 in the advanced course.

At the end of the school year 1920-21, one (1) student received a reserve commission as Second Lieutenants of Coast Artillery, and one (1) student received a commission as Second Lieutenant Quartermaster Corps (Motor Transport Branch).

At the end of the school year, 1921-22, three (3) students received Reserve Commissions as Second Lieutenants, of Coast Artillery, and four (4) students received Reserve Commissions as Second Lieutenants of the Quartermaster Corps (Motor Transport Branch).

Towards the close of the school year 1920-21, the War Department revised its regulations so as to increase the number of basic students in the Coast Artillery unit from 50 to 100. As a consequence, it became impossible to keep three units up to the minimum strength required by law, and, at the request of the institutional authorities, the Infantry unit was withdrawn, leaving the Coast Artillery and Motor Transport units.

Despite the withdrawal of the Infantry unit, the amount of equipment on hand remains intact. In addition, one (1) 155 mm. G. P. F. gun was received during the school year 1921-22.

Equipment on hand is adequate, is up-to-date, and is splendidly sheltered and cared for.

New uniforms, complete, with the exception of shoes, are issued every two years. In addition, one dollar per student is allowed the Institution each year for the repair and renovation of the uniforms on hand.

Advanced course students now receive commutation or subsistence at \$0.30 per day for the two years they are enrolled in the course. They are required, in addition, to attend one advanced course summer camp of six weeks duration held at the regular army station, where they are instructed in the practical handling of the weapons and equipment of the particular arm of the service they are studying.

The basic course training during the period reported upon has been of high standard and enhanced interest. It has become increasingly apparent that the students themselves were learning more and more to place a high value upon the training received.

The advanced course training has become inspiring in its aspect as its possibilities have become more and more apparent. This training is of the highest value because it not only trains the student in leadership and its application to the arts of peace, but its graduates are capable of instantly taking their places in command of men under arms in the event of a national emergency. All this without interfering in the slightest with the study of the life work for which the student enters college primarily.

The following officers were on duty during the bien-nium 1921-22:

Major Russell P. Hartle, Inf. P. M. S. & T., to Sept., 1921.

Major Alexander C. Sullivan, C. A. C., from Sept. 8, 1920.

P. M. S. & T., from Sept., 1921.

Captain Charles Challice, Jr., Q. M. C. from Nov. 27, 1921.

In addition, three Sergeants and two other enlisted men have been on duty.

A Coast Artillery Laboratory has been set up, which is a replica of the plotting room for a Coast Defense high-

powered gun battery. The Motor Transport equipment is housed in a splendid garage.

The out-door drill field provided is adequate in every way and splendid for its purpose. Consequently out-door drill is held whenever the weather permits.

Some day, when the finances of the Nation and the State have weathered the financial storm they are now passing through, it is hoped that a splendid armory will be built upon the College campus to house the Military Department, its entire equipment, and provide ample indoor drilling space, which is now rather inadequate.

Respectfully submitted,

ALEXANDER C. SULLIVAN,

Major, C. A. C. (DOL).

Professor of Military Science and Tactics.

DEPARTMENT OF MODERN LANGUAGES

To the President of the College:

Sir: I have the honor to report herewith the Department of Modern Languages for the past biennium.

The department shows a growth the past year of fifty-three (53) per cent, the number of student class room hours for 1921-22 being two hundred five (205) while for 1922-23, in the Fall Quarter, it is three hundred fifteen (315).

Besides his work in the department the head has conducted each year, a course in journalism, in which some students earned as high as twenty-five dollars (\$25.00) selling articles to Utah and National farm magazines. The head has also been the editor of the Extension News for the Extension Service for the past two years, and has done much work in College publicity.

Respectfully submitted,

FRANK R. ARNOLD,

Professor of Modern Languages.

DEPARTMENT OF MUSIC

To the President of the College:

Sir: I have the honor to submit herewith a report of the Department of Music for the past biennium.

There is a growing enthusiasm among the students of the various classes of the College. The past two years shows the largest attendance of any like period.

Our courses in music include:

1. Theory—fundamental and advanced; history and school music.
2. Concerted work—Orchestra, band, quartette and trio practice, choir, glee club (Men's and Women's).
3. Applied music—vocal and instrumental.

This work is pursued outside the College, but with accredited teachers, the pupil pays the teacher's fee. The fairly liberal credits allowed for his particular work is helpful, and I am sure results in better preparation on the part of the pupil.

I do not hesitate to say the expenses are moderate in view of the work accomplished.

Respectfully submitted,

G. W. THATCHER,

Professor of Music.

DEPARTMENT OF PHYSICAL EDUCATION FOR MEN

To the President of the College:

Sir: I have the honor to submit herewith a report of the Department of Physical Education for Men for the past biennium.

The department as at present organized gives physical training to all the men in the Institution with the exception of the Federal Trainees. A class in corrective gymnastics ~~has recently been~~ organized for those who are physically unfit to do the regular floor work. There has been an average registration of ~~500~~ ^{three} men per quarter for the past two years, doing work in the gymnasium ~~three~~ ^{was} times a week.

Wrestling, boxing, handball and swimming have proved to be very popular. At the close of every gymnasium period enough time is provided that every man can practice swimming.

The gymnasium is provided with one handball court, which is not enough to supply the present needs. There are always men waiting to use the court.

It has always been the policy of this department to work in perfect accord with the Department of Competitive Athletics, for men who are out for any branch of athletics under Coach Romney have been excused from the Physical Education classes.

Last year our gymnasium received a large supply of equipment, which places it on a par with the best gymnasiums.

The department has grown so that the preatest need at present is a larger instructional force. The people of the State are demanding trained leaders in physical education in our high schools and other social organizations.

Our graduates in Education need instruction in organized play, for this is becoming an important part of the common school curriculum. Our athletes need instruction in how to conduct gymnasium classes in physical education, for a great number of them are in demand each year as coaches and physical directors. A class of this description will be organized during the Winter Quarter of 1922-23.

Respectfully submitted,

JOSEPH R. JENSON,
Assistant Professor of Physical Education.

DEPARTMENT OF PHYSICAL EDUCATION FOR WOMEN

To the President of the College:

Sir: I have the honor to submit herewith a report of the Department of Physical Education for Women for the past biennium.

Enrollment in Classes Fall, Winter and Spring Quarters

Courses	Number of Students		
	Credits	1920-1921	1921-1922
Physical Education 10, Elementary Gymnastics	3	50	23
Physical Education 11, Freshman Gymnastics	3	85	103
Physical Education 12, Sophomore Gymnastics	3	57	53
Physical Education 13, Aesthetic Dancing	3	23	28
Physical Education 16, Interpretive Dancing	3	15	5
Total	—	230	212

Summer Quarter

	Credits	1920-1921	1921-1922
Physical Education 1, General Gymnastics	1	14	22
Physical Education 2, Folk Dancing	1	19	10
Physical Education 3, Games	1	26	..
Physical Education 4, Swimming	1	23	..
Physical Education 13, Aesthetic Dancing	1	..	36
Total	—	82	68

In addition to the courses listed above, the department has provided an opportunity for women students to swim and play tennis. Work in personal hygiene has also been given.

All students have been required to take both a physical and medical examination before participating in any work on the gymnasium floor.

The department offers courses in physical education to all women students. At present, however, the work is compulsory for Freshmen and Sophomores only, and for special students during their first two years in college. Only those who are physically unable to take part in the work receive an exemption.

Suggestions

Classes in corrective and remedial gymnastics should be offered for those students who are unable to take regular gymnasium work.

Athletics, so necessary for mental, moral, physical and social development, should be organized for women students. For this, more athletic equipment is needed.

Courses for teachers of physical education should be offered.

Equipment for sterilizing and drying swimming suits should be installed in connection with the swimming pool. Until this is done, it will be impossible to keep the pool clean.

Locker equipment is entirely inadequate. One hundred new lockers should be installed.

Some work in physical education should be required of all women students during their entire college life. I believe that credit should be given in this department toward graduation.

Respectfully submitted,

KATHARINE M. COOPER,

Associate Professor of Physical Education for Women.

DEPARTMENT OF PHYSICS

To the President of the College:

Sir: I have the honor to report herewith the Department of Physics for the past biennium.

There were 128 different students receiving instruction in physics during the year 1920-21, and 131 during the year 1921-22, each taking an average of a three credit course throughout the year. This is approximately an increase of one-third over the registration in the department during the previous biennium. More different courses were taught by the department during the last two years than in any previous two years of its history. In fact the number of credits taught by the department was approximately 20% more than the previous biennium. The average size of a physics class was 24 students.

Almost the entire time of Dr. Gardner was devoted to experimental research. During 1920-21 Mr. Edlefsen taught 15 credits of mathematics in addition to his work in the physics department. The following year his entire time was devoted to instructional work in physics. This change was brought about due to the growth of the department and the withdrawal of certain time of the head of the same to be applied as Dean of Faculty.

This year Mr. Edlefsen is doing graduate work at the University of California. Dr. Gardner is teaching one three-credit graduate course in mechanics. The laboratory work is being handled by two senior students who are specializing in physics. The class work that was taught by Mr. Edlefsen is being taught by the head of the department. This additional teaching in connection with the enlarged duties connected with the chairmanship of committee on Attendance and Scholarship, Committee on Graduate work, the Chapel Committee, and the general work as Dean of the Faculty is becoming very burdensome to the head of the department. It is therefore recommended and urged that Mr. Edlefsen return to the department next year, and that ample funds be provided to satisfactorily take care of the office work connected with the duties just mentioned.

Respectfully submitted,

FRANKLIN L. WEST,
Professor of Physics.

DEPARTMENT OF PHYSIOLOGY

To the President of the College:

Sir: I have the honor to report herewith the Department of Physiology for the past biennium.

The number of students registered in the department was as follows:

1920-21	103
1921-22	148

The registration this year will be fully as great as last. This shows a marked gain over the last biennium. The number taking work would have been even greater than this if it had been possible to give the advanced courses which have been called for. In the future it is going to be imperative that we give more advanced work in physiology to meet the need of students in education and in nursing. This can only be done when we are given more help. At present Prof. Carter is on half-time (college) and he is teaching the physiology and assisting with the bacteriology. It would require his entire time to adequately care for the work in physiology.

Provided we are granted the full-time assistant asked for in the report of the Department of Bacteriology, the present number of the department will be able to take care of the teaching during the next biennium.

Just as soon as it is found possible laboratory work in physiology should be given. This would necessitate a laboratory, a laboratory assistant, and equipment and supplies for the laboratory. Until such time as this can be done, we shall have to content ourselves with class-room demonstration. There should therefore be an annual appropriation of \$200 to buy the necessary apparatus and supplies for class-room demonstrations.

Respectfully submitted,

J. E. GREAVES,
Professor of Physiology.

DEPARTMENT OF PUBLIC SPEAKING

To the President of the College:

Sir: I have the honor to report herewith the Department of Public Speaking for the past biennium.

Classes

During the year 1921-22 there were 191 different students registered in the department in the following classes:

Extemporaneous speaking	81
Public speaking	12
Vocal Interpretation	83
Dramatic Interpretation	15

Total 191

Activities

The dramatic and oratorical activities of the school come under the direction of the Department of Public Speaking. There are three oratorical contests in which a great number of students participate. The interest in this line of work seems to be steadily increasing. Each year a Freshman Class play, a College play and one or two Periwig plays are presented by the students. The department also co-operated with the Community Theatre of the City.

Needs

The work of the department, especially in dramatic activities, should be enlarged, but this is impossible with only one instructor. As it is, the enrollment in Extemporaneous Speaking is so large that the classes have to be sectioned and this, with some English instruction, gives the one professor little time to attend to the very vital outside activities.

The crying need of the department, so far as equipment is concerned, is a suitable room in which to work. The plays have to be presented in one of the city auditoriums, and this gives no place for rehearsal. The players

and coach have to hire a hall, or beg for any unused place in the city that may happen to be available for one evening. Though a real auditorium at the College may not be possible in the near future, I believe that with relatively small expenditure, one of the larger rooms at the College could be converted into a little theatre. In many schools the manual training and art departments have given their laboratory hours to the constructing and decorating of such a hall, and I think this might be arranged here. Such a theatre would give a laboratory for the classes in Dramatic Interpretation and Public Speaking. Many of the other departments on the campus find themselves seriously hampered by the lack of a satisfactory meeting place for small audiences, and this room would admirably serve such a purpose.

Respectfully submitted,

IVA MAUD DUNN,

Assistant Professor of Public Speaking.

DEPARTMENT OF TEXTILES AND CLOTHING

To the President of the College:

Sir: I have the honor to report herewith the Department of Textiles and Clothing for the past biennium.

1. Department enrollment for 1920-21 as follows:

	Fall	Winter	Spring
Textiles and Clothing I.....			
Sec. 1.....	24	24	18
Sec. 2.....	18	18	17
Sec. 3.....	..	15	8
Sec. 4.....	11	12	13
Textiles II.....	33	33	..
Textiles III.....			
Sec. 1.....	11	10	..
Sec. 2.....	..	20	13
Sec. 3.....	15	..	..
Textiles IV.....	11	12	11
Textiles V.....	..	25	19
Textiles VI.....	12	12	12
Textiles a.....	9	18	11
Textiles b.....	10	11	12

SUMMER SCHOOL, 1920

	First Term	Second Term
Textiles and Clothing a.....	13	13
Textiles and Clothing 6.....	11	..
Textiles and Clothing 3.....	16	..

1921-22

	Fall	Winter	Spring
Textiles and Clothing I.....			
Sec. 1.....	19	17	14
Sec. 2.....	16	17	15
Sec. 3.....	..	12	10
Sec. 4.....	20	18	15
Textiles and Clothing II.....	28	30	..
Textiles and Clothing III. (Millinery)			
Sec. 2.....	..	15	15
Sec. 3.....	12	..	..
Sec. 4.....	..	5	..
Textiles IV. (Handwork).....	7	8	8
Textiles V. (Design).....	29	29	24
Textiles VI (Adv. Dressmaking).....	15	15	14
Textiles a.....	10	14	10

SUMMER SCHOOL, 1921

	First Term	Second Term
Textiles for Teachers.....	12	5
Textiles 2a.....	6	5
Textiles 3.....	..	10
Textiles a.....	10	..

Equipment

The present yearly budget allowance for the Textiles and Clothing Department will probably be adequate for supplies and additional equipment needed during the next two years.

Class Rooms

As we suggested in the last biennial report, room No. 36 used for classes in Millinery and Textiles and Clothing 10, is found to be too small to comfortably accommodate the present enrollment in those classes. The adjoining small lecture room is not in use, partly because of its size and partly because of the inadequate heating facilities; it is, therefore, suggested that the partition between these two rooms be removed and one large laboratory be made.

Teaching Staff

Owing to the change in character of the registrants in the Textiles and Clothing Department,—that is, the very great decrease in number of vocational students and the gradual increase of students of college grade, it is suggested that a readjustment of the teaching staff should effect at once economy and strengthening of the work in the School of Home Economics.

Respectfully submitted,

JOHANNA MOEN,

Professor of Textiles and Clothing.

DEPARTMENT OF VETERINARY SCIENCE

To the President of the College:

Sir: I have the honor to submit herewith the report of the Department of Veterinary Science for the past biennium.

The following courses have been given:

Vet. Sci. a (Vocational)	2 sections a year
Vet. Sci. 10 (Junior College)	2 sections a year
Vet. Sci. 13 (Junior College)	2 terms a year
Vet. Sci. 14 (Junior College)	3 terms a year
Vet. Sci. 15	3 terms a year
Vet. Sci. 16	2 terms a year
Vet. Sci. 107 (Senior College)	2 sections a year
Vet. Sci. 108 (Senior College)	2 terms a year
One regular lecture at U. A. C. Practice Farm each week.	

All courses listed have been given during the past biennium.

In addition to the regular instructional work we have done some extension work, experiment work, carried on an extensive correspondence, answering numerous inquiries regarding animal diseases, etc. A number of magazine and journal articles have been written, as well as farm and newspaper articles.

In addition we have looked after the health of all College animals, as well as the animals at the U. A. C. Practice Farms, Nos. 1 and 2. This work consists of testing, vaccinating, and treating, as well as recommending methods of handling.

Laboratory or clinic is required of all students taking Veterinary Science. Our classes in this work are usually large, especially during the Winter Quarter. It is nearly impossible for one teacher to look after this work properly. We have two days a week for this work, and we are trying to give the students what they actually need in handling livestock on the farm. We should at least have help for the clinic. There is great need of experimental work in animal diseases. More time should be devoted to such investigation.

Veterinary Hospital and Equipment

As outlined in previous reports the greatest need of the Veterinary Department is a building where all laboratory work could be accomplished, and where sick and disabled animals could be properly taken care of. At present, students and instructor at our clinics are compelled to work out in the open with no protection from inclement weather, thus not allowing efficient work nor proper care of the animals.

A hospital and equipment with instruments, museum, etc., is a great necessity for our Institution. I would refer you to former reports for estimate and full explanation. The opportunities for service by the Veterinary Department have never been greater. Better livestock is the rule and greater care in handling must be practiced. Diseases must be prevented and many losses averted. Human health must be protected. Many animal diseases in addition to being destructive to livestock, are communicable to and fatal to man.

Respectfully submitted,

H. J. FREDERICK,

Professor of Veterinary Science.

VETERANS' BUREAU CO-OPERATION

To the President of the College:

Sir: I have the honor to report herewith the work we are doing in co-operation with the Veterans' Bureau.

Immediately after the close of the war the Utah Agricultural College was called upon to re-train wounded soldiers, sailors, and marines in co-operation with what was then known as the Federal Board for Vocational Education. The re-training of these disabled service men is now handled by what is known as the Veterans' Bureau.

During the previous biennium the maximum number of men enrolled at the Institution was one hundred and seventy (170). These men were taking courses in Auto Mechanics, Roads, Machine Work, and General Agriculture. At the beginning of this last biennium, in an attempt to give the Veterans' Bureau students in General Agriculture more practical training than they were then getting, we decided to establish practice farms, where the most practical type of agricultural training could be given those men desirous of going immediately from school to the farm to make a living. The Government very liberally co-operated in the leasing of these practice farms and was very willing to increase the price paid per student which had been received to give the men the advantage of this practice training. Due to this fact our numbers have increased from 170 to 278 for the year 1921, and 250 up to the present time for 1922. We expect that it will go higher than for the previous year before the end of the current school year.

Ours is the only institution that has tried this type of practical training, and we are receiving daily very favorable comments upon our work from both the District office and the Washington office. The work in all departments covering the Veterans' Bureau is now progressing very satisfactorily.

Respectfully submitted,

RAY B. WEST,

Director of Vocational Education.

DEPARTMENT OF ZOOLOGY AND ENTOMOLOGY

To the President of the College:

Sir: I have the honor to report herewith the Department of Zoology and Entomology for the past biennium.

In the following table will be found a synopsis of the courses given in the department:

No. of Course	Name of Course	Fall 1921	Winter 21-22	Spring	Summer 1922
Ent. a	Elementary Apiculture.....	..	..	..	..
Ent. b	Advanced Apiculture .....	..	..	..	..
Ent. 1	Agricultural Entomology.....	..	25	..	..
Ent. 2	Systematic Entomology.....	..	..	..	..
Ent. 3	General Entomology	10	..	..	..
Ent. 4	Economic Entomology .....	..	9	..	..
Ent. 5	Field Entomology .....	..	..	8	..
Ent. 114	Entomological Literature.....	..	..	..	..
Ent. 115	Entomological Technique.....	..	..	..	..
Ent. 180	Research .....	..	2	3	1
Zoo. 1, 2	Elementary General Zoo.....	40	65	27	12
Zoo. 3, 4	General Zoology.....	..	31	28	..
Zoo. 5	Economic Zoology .....	..	..	..	..
Zoo. 6	Parasitology	3	..	1	..
Zoo. 101	Advanced Zoology.....	..	..	..	..
Zoo. 111	Genetics .....	..	51	..	1
Zoo. 112	Eugenics .....	..	..	25	2
Zoo. 121	Histology and Embryology.....	..	..	..	..
Zoo. 201	Research .....	..	..	..	..
Nature Study .....	.....	..	..	..	50

The courses in Apiculture which are conducted at present for disabled soldiers were taught in 1921 by Mr. G. E. King, who is now studying in the University of Illinois. During the present year the work is being taught by Mr. M. A. Gill, who himself is a very successful bee-keeper. Since the departure of Mr. King, Mr. J. M. Stevens, a senior this year, has been acting as laboratory assistant and helping in field work during the summer.

One of the outstanding needs of the department at present is a special appropriation with which to buy new material for the museum. Most of the present material needs repairing, rearranging, and classifying. During the past year a start has been made in making an attractive exhibit collection of insects, so that it may be intelligible to all visitors. The collection of birds especially needs attention. This could readily be made of great educational value to the many boy scouts and other visitors of the museum. If a student with ability as a taxidermist could be employed in his spare time for a few years in collecting and mounting Utah's birds and in arranging our many

undetermined insects, it would be of great permanent value to the department.

During the present year there have been calls for courses in Advanced Zoology and Histology and Embryology as well as courses in Entomology, which have been taught in recent years. The registration in the elementary courses in Zoology has been steadily increasing, and Professor Pack's courses in Genetics and Eugenics have been especially popular.

There is a great need for increasing our library facilities. Some standard books have been purchased during the past two years from department funds, but there is still need for more for the use of the advanced students taking up work in this line. An effort is being made to establish a complete file with index of the current bulletins in Entomology. Several hundred dollars could well be spent for special books not in our College library.

Respectfully submitted,

IRA M. HAWLEY,

Professor of Zoology and Entomology.

DEAN OF WOMEN

To the President of the College:

Sir: I have the honor to submit herewith report of the Dean of Women.

The position of Dean of Women was created July 1, 1922; Miss Charlotte E. Dancy being appointed to the office. The object is to have available to women students an advisor who shall have time and disposition to hear and consider any problems which may confront them, other than those met in the class-room.

This year the Dean of Women and the woman vice president of the Student Body attended the Conference of Deans of Women and the Western Conference of Women Students in Salt Lake City, November 8, 9, 10. Subsequently the women students of the U. A. C. were organized into a Woman Students Association, which has become a member of the National Women's Students Organization.

We hope to develop in our women students self government in affairs pertaining to them. We hope to unify the women students to the end that those in the upper classes will set the standard in all college matters relating to women, and will be responsible for Freshman girls in all such matters; to increase the interest of all women in student activities; to develop leadership to the end that each student after graduation shall become a leader in her own community affairs. From time to time lecturers are being invited to meet with the Women's Student Association to discuss problems of interest.

This year the Rest Room and Dean's Office have been repainted and new curtains selected. The color scheme and designs are the work of a senior student, who did this work as part of her assignment in the Art Department. The Kappa Omicron Kappa and Home Economics Clubs have presented the Rest Room with an electric hot plate, which is being installed in the Dean's Office—to the end that hot water for either medical or dietetic purposes may be always available.

We look forward to having an emergency sewing basket; to having all couch and pillow covers of washable materials; to having more writing-table room, more space for lunches and books, more trash baskets, a few more chairs,

another rug and the screen re-covered. The small room on the third floor which was reserved as an accessory Rest Room has been found to be unnecessary and the couches have been removed, one to the Registrar's Office, and two to the Dean's Office, until some use shall be found for them.

The Dean of Women has assisted the Student Employment Committee to secure employment for girls who are working their way through college.

In order to facilitate the Dean in her work, it is recommended that all women students register with the Dean on regular registration days, and that she fill out a card which will contain her name, address, telephone address and rank in school.

Respectfully submitted,

CHARLOTTE E. DANCY,

Dean of Women:

DEPARTMENT OF MEDICAL SUPERVISION

To the President of the College:

Sir: I have the honor to report herewith the Department of Medical Supervision for the past biennium.

The department as now organized, consists of a physician and surgeon, (part time), and a graduate trained nurse, (part time). The duties of this department are physical examinations of all students entering school, and medical care and treatment of illnesses and injuries of all students.

The physician and nurse take care of these students, either at the office or at home as necessary. The students receive medical care and attention and all medicines for their medical fee.

Our offices, at present, are inconvenient, and I recommend that they be remodeled, which would cost approximately \$500.00, including some new equipment which is necessary.

Respectfully submitted,

W. B. PRESTON,

Medical Supervisor.

BOY SCOUT ACTIVITIES

To the President of the College:

Sir: I have the honor to report herewith Boy Scout Activity for the past biennium.

The Scoutmasters' Convention was held at the Agricultural College last year from January 16th to 28th. Eighty-seven scoutmasters enrolled in the course. These came principally from Idaho and Utah, but we had representatives from Oregon, Wyoming, and Nevada. A lot of the men have asked the privilege of getting additional work along this line and a splendid spirit of friendliness toward the Agricultural College has been made through the fact that the College has lead out in this very essential line of recreational work.

The men were housed in the Plant Industry Building. Cots and blankets were furnished them by the College. They received their meals at cost at the cafeteria. Twenty of our faculty members took part on the program.

This year a Scoutmaster's Convention of one week's duration will be held.

A two-credit course was given in Scoutmastership the Spring Quarter. This course was listed as Education 3 in the College catalog, and there were 36 men regularly registered for the course and 15 men who took the course as listeners. This course was very successful. Fifteen members of the faculty constituted the instructors of this course.

America is facing a crisis. Country boys are leaving the farm for the city. This cannot continue long without weakening the morale of country communities, which are the backbone of our Republic. Boys come from the farm to take up other lines of work, not because of the drudgery of the farm, nor the long hours, but on account of the isolation and lack of recreational facilities. Scouting gives to boys the ability to find their own recreation in the great out-of-doors with which the country boy in particular is blessed. The feeling is shared all over the country that recreational work of the nature of scouting, which more than recreates the boy, is the thing that will offset this tendency to leave the farm because of greater opportunities for recreation in the city. As

champion of the rural community, it is the opportunity of the Agricultural College to give to its graduates who will go out into rural communities as leaders in various lines of activity, the ability to conduct scout troops and to lead out in other forms of rural leadership. It is the recommendation, therefore, that this course in scouting be expanded to give more men an opportunity to prepare themselves for this field of activity, and that to further the ends of scouting and recreational work in the school, a man be employed to devote at least part of his time to the technique of scouting.

Respectfully submitted,

GEORGE R. HILL, Jr.

Chairman, Committee on Boy Scout Activity.

LIBRARY

To the President of the College:

Sir: I have the honor to report herewith the Library for the past biennium.

The following number of students are enrolled in Library work:

1920-21—4

1921-22—11

The work consists in acquainting the students with the Library; in giving special training in researching for information, and in the use of reference books in general.

During the past two years the use of the Library has steadily increased.

To take care of the many students we need more efficient help and more books.

The reserve books now on the shelves are inadequate. We must have duplicates of technical books and magazines. We are frequently embarrassed on account of our deficiency in books on current literature. To do all this we must have a larger appropriation.

When we realize that our books are housed in a building that is not fire-proof, we feel the urgent need of a new library.

The following is a statement of the Library accessions:

Library Accessions—Statistical

Books purchased	1,307	
Books by gift	160	
Books deposited by U. S. Government....	321	
	<hr/>	
Total books		1,788
 Pamphlets purchased	10	
Pamphlets by gift	2,814	
Pamphlets by gift U. S. Government.....	7,442	
	<hr/>	
Total Pamphlets		10,266
	<hr/>	
Total addition to Library		12,054

Present Strength of Library

Books	35,770	
Pamphlets (estimated)	55,832	
	<hr/>	
Total		91,602

Books of the two years are classified as follows:

Cyclopedias Bibliography	28
Periodicals (Unclassified)	263
Philosophy and religion	50
Useful Arts, Agriculture and Home Economics ...	650
Science	194
Fine Arts	35
Literature and Language	53
History	112
Sociology	211
Fiction	102
U. S. Government documents (Unclassified)	90
	<hr/>
Total	1,788

Respectfully submitted,

HATTIE SMITH,

Acting Librarian.

CAMPUS DEPARTMENT

To the President of the College:

Sir: I have the honor to submit herewith a report for the Campus Department for the past biennium.

New Improvements

One hundred and forty Norway maple trees (*Acer platanoides*) have been planted around the quadrangle east of the main building.

A new drilling ground has been put in condition for military drills, located immediately west of the "windbreak" and east of the main building.

A new six-foot walk (cement) has been constructed leading from the Smart Gymnasium to the bottom of the hill at the end of the car line.

A cement curbing has been constructed on the outer side of the drive immediately south of the Mechanic Arts Building.

A driveway leading from Fourth North and south to the College has been widened to such an extent that it may now be considered the main entrance to the College.

A new six-foot cement walk has been constructed which leads from the Chemistry Building west to the Smart Gymnasium.

Respectfully submitted,

EMIL HANSEN,

Superintendent of Grounds and Greenhouses.

COLLEGE FARM DEPARTMENT

To the President of the College:

Sir: I have the honor to report herewith the Farm Department of the College for the past biennium.

While it is the business of this department to serve and make an effort to satisfy all other departments of the Institution, the hearty co-operation that exists between the various departments and the Farm Department makes the task a most pleasant one.

Following is a list of some of the most important improvements made by the Farm Department during the past biennium:

1. The large heaps of gravel excavated from the basements of the Plant Industry and Agricultural Engineering Buildings have been removed and utilized as filling in various places.

2. A change in the road has been made south of the Mechanic Arts Building.

3. Roads around the barns and the road leading west, and one leading south from the dairy barn, as well as parts of various other roads, have been graded.

4. The level of the floors in the three sheds east of the dairy barn, the machine sheds, and the level of the yard north of the horse barn, as well as the corrals east of the horse barn, have been raised sufficiently to keep these places fairly well drained.

5. The path on the south side of the street bordering the College campus and farm on the north has been graded from the northwest corner of the campus to the east end of the College farm.

6. One hundred and fifty feet of cement pipe has been placed at the south end of the Federal Motor Shed to prevent water from washing out and doing damage to property below the hill. A new ditch has also been constructed from the Federal Motor Shed to the southwest corner of the campus.

7. The old cesspool east of the south wing of the Main Building has been filled and covered with a layer of fertile soil.

8. A new fence has been constructed across the west end of the pasture located in the west fields.

9. Irrigation ditches in the pastures have been improved so that a good stand of blue grass now grows on spots that heretofore were practically barren.

10. Thru putting in operation a new system of crop rotation for the farm in 1920 higher crop yields are already being realized. The farm, during the summer of 1922, has produced besides about 8 tons of potatoes for the College cafeteria, some experimental potatoes, and a considerable amount of experimental wheat and oats, enough corn to fill two 75-ton silos, and hay enough to feed the nine head of college horses during the next year.

The improvements listed (except the pipe line south of the Federal Motor Shed, which cost \$123.20) have not been taken care of by special appropriation, but have been made at odd times outside of the regular farm work and during the winter.

In addition to the regular farm work and the work above outlined the department has done nearly all college freighting (outside of delivering coal), hauled all gravel used for construction work on the campus, and furnished all team work on roads, campus, and experiment farm at North Logan.

Some of the farm equipment has become unserviceable thru many years of constant usage. Much of this, to insure the greatest economy in every way, should be replaced during the next biennium. The most urgent needs are: (1) a good span of draft horses to replace some animals that have lost their usefulness thru age; (2) two farm wagons; (3) one hay mower; (4) one corn drill; and (5) one spike-tooth harrow.

Following is the approximate cost of the equipment just described:

1 span of draft horses	\$350
2 farm wagons	300
1 hay mower	70
1 corn planter	90
1 spike-tooth harrow	30
<hr/>	
Total	\$840

Respectfully submitted,

PETER NELSON,
In charge, College Farm.

DEPARTMENT OF REPAIRS AND IMPROVEMENTS

To the President of the College:

Sir: I have the honor to submit herewith the report of the Department of Repairs and Improvements for the past biennium.

These are only a few of the improvements made during the last two years: In the Mechanic Arts Building a more uniform lock system was installed. This was also done with respect to all outside doors in the Main Building, all the barns, the dairy rooms, the rest room, the nursing laboratory, the administrative offices and many other offices and laboratories, including shower and locker rooms in the gymnasium, were either painted or kalsomined. A considerable number of pieces of furniture for the various departments have been made. A root cellar for the use of the Cafeteria was built. The roof of the entire Mechanic Arts Building was covered with asphaltum, and will not need further attention for a number of years.

A lumber curing room was partitioned off in the Mechanic Arts Building, also a tool room for the Machine Department. A number of partitions have been either removed or erected, creating additional offices or classrooms as occasion has demanded.

Some needed repairs were made on various cattle and implement sheds, and an additional greenhouse is in course of erection.

In addition to the items mentioned we have the ever present upkeep of window-glass and shades, furniture and lock repairs and numerous other items of a daily occurrence. Because of limited funds we have not been able to do as much as we should have done for the best upkeep of the entire plant, but all the buildings have received some attention so that none are suffering from serious deterioration.

During the coming biennium I hope the funds for repairs and improvements may be increased, as many of the buildings shall need more attention than they have received for a number of years. The Main Building, Gymnasium, and Home Economics Building will all need exterior painting during that period. Some roof painting

on other buildings will also be needed. The second floor of the Chemistry Building should be plastered, as that has never been done.

The lavatories in some of the buildings, especially the Gymnasium, and Chemistry Building, should present a better appearance and be more sanitary than at present.

In the Main Building we shall need some floors replaced with hardwood flooring, and much interior painting is badly needed.

In conclusion I wish to thank you for your kind interest and sympathy in the work we have to do, also for your just disposition of funds at your disposal.

Respectfully submitted,

R. O. LARSEN

Superintendent of Buildings.

DEPARTMENT OF WATER, HEAT, LIGHT AND SEWERAGE

To the President of the College:

Sir: I have the honor to report herewith the Department of Water, Heat, Light and Sewerage for the past biennium.

Since my last report we have not been able, through lack of funds, to make any of the previous suggested improvements, except that the main steam pipes have been covered in tunnel.

We are very much in need of an ash conveyor in the boiler-house. At present we have to move the ashes four times before they are disposed of. This causes a great deal of extra labor and keeps our boiler-house very dirty from dust all the time.

We need another 150-horse boiler. There has been added to the plant some extra load such as taking care of the dormitory and the drying-room at the Mechanic Arts Building, and there is still another request for steam at the new greenhouse. As it is, if we have to shut off one boiler for repairs at any time we have not enough boiler capacity to carry the present load. With another boiler it would also require another stoker. Then again, the boiler-house should be completed so that new coal bins for storage could be built in as planned.

Cost of new boiler with stoker and installation	
of same	\$ 3,000
Completing of building with coal bins.....	15,000
Ash conveyor	2,000
Maintenance for next two years, coal.....	26,000
Firing tools, oil, beltings, waste.....	400
Repairs on stokers, extras, radiator valves, pipe	
and fittings	600
New pump rods, valves, etc.	250

Water Works and Sewerage

The barns and cottages are still connected with the city water main and it has been suggested that they be changed to our own water mains. If this is to be done

it will need 820 feet of 4-inch galvanized pipe, 450 feet of 1¼-inch galvanized pipe, and the digging of 1200 feet of trench 4 feet deep and back filling, with labor to install pipe.

Estimated cost of maintenance such as valves, taps, fittings, tools, taxes.....	\$3,000
Sewerage maintenance	300

Power and Lights

The present transformer for power lines is overloaded and we need a larger transformer if it is possible to get one. The old one could be changed over to the lighting side, giving more efficiency to the lighting system which is also loaded to its capacity when all the buildings are lighted at night.

The cost of a transformer and its installation would be about	\$1,000
Estimated maintenance for next two years, lamps..	1,500
Wire, fuses, tape, knobs, cleats, rosettes, tools, bat- teries for bells, clock, etc.	600
New bearings, cable locks, hinges, brushes, etc., for elevator at Home Economics building.....	150

Respectfully submitted,

CHAS. BATT,

Superintendent Water, Heat, Light and Sewerage.

STATE POWER PLANT

To the President of the College:

Sir: I have the honor to report herewith the State Power Plant for the past biennium.

The State Power Plant has had a very successful run during the past two years. It has been closed down for repairs just two days during this period. From a mechanical standpoint the plant has run very successfully and is operating at above 80 per cent efficiency.

The average monthly power consumption at the various state institutions from 1917 to 1921 inclusive, is as follows:

Institution	1917	1918	1919	1920	1921
Prison	4,550.1	5,531.6	6,972.4	13,654.9	14,672.4
U. of U.	5,385.7	6,120.5	9,850.2	12,515.2	13,029.1
Capitol	15,719.7	15,655.7	14,985.6	16,666.3	19,891.3
Industrial	4,987.6	5,485.1	4,342.2	5,904.6	6,659.7
Deaf and Blind ..	1,879.3	1,995.5	2,399.9	1,950.1	2,527.8
Armory	390.4	217.2	104.8	356.5	198.8
Totals of Institutions	32,885.8	35,005.6	39,655.1	51,049.6	56,979.1

1917 to 1918 shows an increase of 6.4% in consumption of power
 1918 to 1919 shows an increase of 13.2% in consumption of power
 1919 to 1920 shows an increase of 28.8% in consumption of power
 1920 to 1921 shows an increase of 11.6% in consumption of power

Increase in consumption of power at the state institutions between 1917 and 1922—73%.

In February, 1920, a transformer was burned out at the State Prison and the Utah Power and Light Company was called upon to install new ones. This was done but instead of putting in transformers of the same ratio as the ones previously used they changed the ratio to 3 to 1 instead of 1 to 1 as formerly. This was not reported as a change in the reading of the meter dial, and hence neither myself nor the representative of the power company with whom I deal were aware of the change and it was not discovered until last winter. The meter had been

the next biennium period the meter will have been recording as above for 37 months.

The biennial requirements were based on the other figure which was one-third what the meter was recording, hence a deficit must be met of approximately \$4,000.00.

As the Capitol grounds have been improved with flowers and shrubs, it has been found necessary to light the grounds to prevent theft of flowers. This ground lighting had not been found necessary until the last two years. The Capitol building on the exterior has been lighted during the summer months for the past two years. These two items have also aided in making the deficit for this biennium, as stated above.

Our requirements for the next biennium are as follows:

Office expenses	\$ 211.08
Salaries and wages.....	12,636.68
Maintenance and transmission charges.....	33,434.36
Repairs	1,300.00
Travel	100.00
Equipment	144.00
Equipment renewals	6,200.00
TOTAL	\$54,026.12

Respectfully submitted,

RAY B. WEST,

Engineer in Charge.

PURCHASING DEPARTMENT

To the President of the College:

Sir: I have the honor to report herewith the Purchasing Department for the past biennium.

It is difficult for me to report the conditions prior to July 1, 1922, as the work of the department was at that time under the supervision of the Financial Secretary, and the present purchasing agent was only indirectly connected with the management of affairs. Since that time, however, a separate purchasing department has been created, and we have been handicapped to a certain extent by having to place all our orders through the State Department of Finance and Purchase which at that time did not fully sense the actual needs of our Institution and took upon itself to substitute in too many instances which necessarily caused a good deal of criticism and in many instances worked to a disadvantage for some of the departments. However, this difficulty has been overcome and there should be no further trouble.

I find that the purchasing agent can render a direct service to the Institution in addition to that which he renders in the actual purchasing of materials and supplies. With the range of observation and his knowledge of things which will escape the specialists of the laboratory, he should co-operate continually with those in charge for cheaper but equally satisfactory products or grades of material which we can use in place of the more expensive. He should have the opportunity of introducing materials and processes subject, of course, to the approval of department heads.

Suggestions

I would suggest that the department be granted a budget large enough to enable it to buy in quantities some of the more staple supplies which are needed about the Institution, such as lumber, cement, and even some of the chemicals which we buy year after year for the separate departments.

In connection with the purchasing department, I should like to have a storeroom large enough to take care

of these supplies and to have someone placed in charge, whose duty it would be to distribute these to the departments as needed. This could be done very advantageously, and would eventually eliminate the present practice of buying in small quantities.

There is another matter which is worthy of consideration, that of inventories. At the present time the inventory system which we use is very unsatisfactory, being obsolete in form, and does not answer the needs of the Institution from the standpoint of furnishing an up-to-date record of all articles purchased for departments. I would suggest the storeroom keeper have charge of all inventories and act as inventory clerk, keeping an up-to-date record of all articles purchased. He would be in direct touch with equipment and apparatus that had been worn out and in many instances could find suitable places for this worn out material where it could be used to good advantage, thereby saving a great deal of time.

Respectfully submitted,

R. E. BERNTSON,

Purchasing Agent.

REPORT OF THE REGISTRAR

To the President of the College:

Sir: I have the honor to submit herewith the report of the Registrar for the past biennium.

Registrar's Report of Attendance by Schools For the Years 1920-21 to May 30, 1921

	Agriculture (Men)	A. E. M. A. (Men)	Commerce (Men)	Commerce (Women)	General Science (Men)	General Science (Women)	Home Economics (Women)	Total	GRAND TOTAL
College—									
Graduates	8	3	2	..	3	5	2	23	...
Seniors	23	7	5	..	3	8	15	61	...
Juniors	12	5	9	1	10	5	11	53	...
Sophomores	43	28	20	4	17	13	33	158	...
Freshmen	68	35	48	6	33	27	56	273	...
Specials	20	17	13	3	13	14	22	102	...
	174	95	97	14	79	72	139	...	670
Vocational	141	230	48	34	10	9	32	...	504
TOTAL	315	325	145	48	89	81	171	...	1174

Summer school, 1920—Men, 159; women, 188..... 347

Correspondence department and extension classes—

Men, 358; women, 284..... 642

2,163

Less names repeated 169

Net Total1,994

Farmers' Conventions and Housekeepers' Conferences

Logan—Men, 127; women, 155; Cedar City—Men,
88; women, 147 517

Junior extension short course, Logan—Boys, 39;
girls, 35 74

Net Total 591

GRAND TOTAL2,585

Registrar's Report of Attendance by Schools For the Years 1921-22 to May 30, 1922

	Agriculture (Men)	Agriculture (Women)	A. E. M. A. (Men)	Commerce (Men)	Commerce (Women)	General Science (Men)	General Science (Women)	Home Economics (Women)	Total	GRAND TOTAL
Collegiate—										
Graduates	10	..	8	7	..	9	5	2	41*	....
Seniors	29	..	4	9	2	9	7	15	75	....
Juniors	20	..	16	16	..	17	7	16	92	....
Sophomores	41	..	15	22	2	16	18	31	145	....
Freshmen	43	1	29	56	13	48	39	38	267	....
Unclassified	12	..	15	15	3	15	20	16	96	....
	155	1	87	125	20	114	96	118	...	716
Unclassified	189	..	187	35	11	22	20	17	...	481
TOTAL	344	1	274	160	31	136	116	135	...	1197

* Total number graduate students, including summer school, was 66.

Summer school, 1921—Men, 269; women, 205.....	474
Correspondence department and extension classes—	
Men, 405; women, 371.....	776
	2,447
Less names repeated—Men, 212; women, 58.....	270
Net Total	2,177

Conventions and Short Courses

Farmers' encampment, Logan—Men, 283; women, 276	559
Short practical courses, Logan—Men, 52; women, 44	96
Scout masters' school, Logan—Men.....	69
Junior extension short course, Logan—Boys, 32; girls, 36	68
Farmers' convention, Cedar City—Men.....	89
Housekeepers' conference, Cedar City—Women..	97
	186
Net Total	978
GRAND TOTAL	3,155

Regular registration, 1922-23 to October 30, 1922...	882
Summer school, 1922.....	582
Correspondence and extension classes.....	620
Farmers' encampment, Logan, 1922—Men, 798; women, 646; children, 616.....	2,060

We herewith submit a conservative estimate of very much needed additional equipment:

Fireproof vault	\$800.00
Additional equipment	200.00
Office desk	100.00
One new typewriter and exchange of the one we now have	125.00

Respectfully submitted,

P. E. PETERSON,

Registrar.

BIENNIAL FINANCIAL REPORT OF THE SECRETARY

For Two Years Ending June 30, 1922

Hon. President and Board of Trustees,

Utah Agricultural College.

Ladies and Gentlemen:

The following is my Biennial Report showing the financial transactions and the financial condition of the Institution for the period from July 1, 1920 to June 30, 1922:

It is made up of the following schedules:

- A. A report of Receipts and Expenditures of all Regular Funds as follows:
 - 1. The College Proper.
 - 2. The Cedar City Branch.
 - 3. The Extension Division
 - a. The State Extension Fund.
 - b. Federal Smith-Lever Fund.
 - 4. The Experiment Station.
 - a. The Government Hatch Fund.
 - b. The Government Adams Fund.
 - c. The State Fund (Approp. and Sales, etc.)
 - d. The Miscellaneous Fund (Sales, etc.)
 - 5. The State Power Plant.
- B. The College Incidental Fund (All Merchandising and Trust Funds)
- C. The Student Body Organization Fund.
- D. Recapitulation—Receipts and Expenditures.
- E. A Summary of the Inventory of all College Property.
- F. A Report of the Fire Insurance Carried.

A. RECEIPTS AND EXPENDITURES

1. The College Proper

RECEIPTS—

Cash on Hand, July 1, 1920	\$ 4,684.20
From U. S. Government (Morrill & Nelson Fund)	100,000.00
From State (General Maintenance—Mill Tax)	243,362.21
From State (Interest on Land Grant)	46,723.19
From State (General Maintenance Deficit Approp.)	71,683.89
From U. S. Federal Board Soldier Training	81,235.83
From State Maintenance—Special Appropriation	94,132.01
Fees from Students (Entrance and Laboratory)	32,886.00
Medical Fees	7,974.00
Copy of Credits and Changing Courses, etc., fees	528.25
Graduation fees	760.00
Acetylene Welding Fees	243.33
Summer School Receipts	5,874.75
Miscellaneous	85.00
Sale of Products, etc.	39,937.96
From State Department of Education on Smith-Hughes Work	4,618.18
From W. W. Henderson, Greenville land sale	2,900.00

SPECIAL APPROPRIATIONS

Special Livestock Appropriation	8,663.48
Grading Sidewalks, etc.	3,200.00
Special Deficit Appropriation for finishing Barracks Bldg.	51.48
Plant Industry Building	33,365.32
Redistribution Water Supply	1,805.05
Addition to Heating Plant	3,991.54
New Pressure Connections	57.55
Purchase of Land	8,862.25
Equipment of Livestock Building	8,833.63
Irrigation Laboratory	2,302.00
Improvement Women's Showers	1,867.82
New Vegetation House	225.59
New Seed House	46.75
New Heating Tunnels	33.32
Miscellaneous Sales	1.40

Total Receipts	810,935.98
----------------------	------------

Add Overdraft on Books	*11,055.20
Overdraft on Treasurer	21,028.22
Less cash on hand	9,973.02

(Including Revolving Fund of \$1,000)

Grand Total	\$821,991.18
-------------------	--------------

*To offset the overdraft there was due us at this time (the entire amount has been received since) from the State Special Maintenance, \$2,318.31 and from the U. S. Federal Vocational Training Board, \$10,435.45, making an actual balance on June 30, 1922 of \$1,698.56.

THE COLLEGE

EXPENDITURES

Overdraft on Treasurer July 1, 1920.....	\$134,327.83
Salaries	393,256.82
From Government Fund	\$100,000.00
From State Fund	293,256.82
Labor (Payrolls)	59,805.29
Supplies	58,285.19
Postage and Stationery	3,887.54
Telephone and Telegraph	3,689.93
Traveling Expense	6,055.99
General Expense	74,646.82
Repairs and Improvements	31,509.51
Furniture and Fixtures.....	9,502.81
Tools, Machinery and Implements	5,480.09
Scientific Apparatus	1,283.42
Books, Maps, etc.....	5,243.55
Livestock	16,478.99
Unclassified Equipment	420.65

Special Appropriations:

Plant Industry Building	\$ 1,077.46
Agricultural Engineering Building	13.00
Land Purchase	10,082.10
New Vegetation House	225.59
Addition to Heating Plant	1,272.54
New Heating Tunnels	26.80
New Water Supply	1,336.86
Rewiring and New Lighting	50.36
New Seed House	46.75
Livestock	2.49
Grading, sidewalks, fences	2,394.56

Special Deficits Allowed:

Finishing Barracks Building	\$ 157.55
Equipment Livestock Building	1,024.20
Equipment Plant Industry Building	136.47
Irrigation Laboratory	14.48
Women's Showers	8.25
Finishing 2nd Floor Plant Industry Building.....	234.29
Finishing 1st Floor Plant Industry Building.....	13.00

Grand Total\$821,991.18

2. THE CEDAR CITY BRANCH

RECEIPTS—

Cash on hand July 1, 1920	\$ 200.00
From State—General Maintenance	61,542.04
From State—Deficit Allowance	13,020.09
From State—Special Maintenance Appropriation.....	26,052.52
From State—Special Appropriations:	
Improvements and Repairs	2,986.67
Livestock	775.00
Fences	249.90
Sewing Machines	192.34
Dairy Equipment	337.74
Replacing Implements and Machinery	500.00
Library Books	284.72
New Buildings	3,857.79
Bookstacks	450.00
Laboratory Equipment	1,500.00
Dipping Vat	75.00
From Fees and Sales	8,536.96
Overdraft, July 1, 1922	13,094.55
Overdraft on Treasurer	13,294.55
Less Cash on Hand	200.00

Grand Total\$133,655.32

EXPENDITURES—

Overdraft on Treasurer	\$ 16,902.07
Salaries	77,410.78
Labor	8,446.88
Supplies	5,199.34
Postage and Stationery	774.81
Printing and Advertising	1,733.65
Light, Power and Fuel	4,370.87
Traveling Expense	1,931.45
Library	695.17
Equipment	982.60
Farm	1,414.70
Insurance	1,563.86
Interest	1,531.21
Repairs	808.62
Dairy Improvements	1,301.88
Sundries	1,962.95
Improvements and Repairs	1,216.11
Livestock	575.98
Fences	249.90
Sewing Machines	130.00
Replace Implements and Machinery	334.45
Library Books	137.69
New Buildings	1,317.46
Bookstacks	450.00
Laboratory Equipment	1,493.80
Dipping Vat	76.00
Addition to Shop Equipment	643.09

Grand Total\$133,655.32

3. EXTENSION DIVISION**a. State Extension Fund****RECEIPTS—**

From State Appropriation	\$123,363.10
From Beaver County	325.00
From Tooele County	425.00
From Morgan County	200.00
From Box Elder County	400.00
From Iron County	325.00
From Wasatch County	325.00
From Washington County	16.67
From Davis County	125.00
From Carbon County	62.50
From Juab County	125.00
From Piute County	62.50
From Garfield County	62.50
From Salt Lake County	200.00
From Summit County	125.00
Auto Sales	1,205.67
Gopher Poison Sales	4,763.03
Round-Ups	412.40
Miscellaneous	696.09

Total\$133,219.46

EXPENDITURES—

Overdraft on Treasurer, July 1, 1920	\$ 9,137.45
Salaries	38,959.45
Labor	1,967.32
Publications	32.90
Printing and Small Stationery	1,047.90
Postage and Stationery	848.70
Heat, Light and Water	
Supplies	5,781.80
Library	71.22
Tools, Implements and Machinery	115.69
Furniture and Fixtures	554.85
Traveling Expenses	16,129.77
Contingent Expenses	1,736.13

Total\$ 76,383.18

State Smith-Lever

Salaries	\$ 40,798.35
Labor	84.25
Stationery and Small Printing	129.97
Postage and Stationery	53.13
Supplies	12.90
Tools, Implements and Machinery	3.00
Traveling Expenses	760.94
Contingent Expenses	40.00

Total\$118,265.72

Balance July 1, 1922 14,953.74

Grand Total\$133,219.46

b. Federal Smith-Lever

RECEIPTS—

From U. S. Government	\$ 61,882.54
-----------------------------	--------------

EXPENDITURES—

Salaries	51,194.62
Labor	990.60
Publications	1,622.22
Stationery and Small Printing	647.71
Postage and Stationery	198.17
Supplies	78.37
Library	70.02
Furniture and Fixtures	121.78
Scientific Apparatus	224.32
Traveling Expenses	6,719.73
Contingent Expenses	15.00

Total	\$ 61,882.54
-------------	--------------

Summary of Extension Division

RECEIPTS—

State Extension Fund	\$133,219.46
Smith-Lever Fund	61,882.54

Total	\$195,102.00
-------------	--------------

EXPENDITURES—

State Extension Fund	\$ 76,383.18
Federal Smith-Lever Fund	61,882.54
State Smith-Lever Fund	41,882.54
Balance as above	14,953.74

Total	\$195,102.00
-------------	--------------

4. EXPERIMENT STATION**a. Hatch Fund****RECEIPTS—**

From U. S. Government\$ 30,000.00

EXPENDITURES—

Salaries	21,485.54
Labor	4,712.50
Postage and Stationery	153.31
Freight and Express	136.89
Heat, Light, Water and Power	275.95
Chemical Supplies	1,134.47
Seeds, Plants and Sundry Supplies	755.94
Feeding Stuffs	113.71
Library	180.80
Tools, Implements and Machinery	137.61
Furniture and Fixtures	31.90
Scientific Apparatus	112.45
Traveling Expense	710.48
Buildings and Land	58.45
Total	\$ 30,000.00

b. Adams Fund**RECEIPTS—**

From U. S. Government	\$ 30,000.00
Balance on Hand July 1, 1920	14.32
Total	\$ 30,014.32

EXPENDITURES—

Salaries	\$ 22,274.80
Labor	4,619.04
Postage and Stationery	9.90
Freight and Express	212.01
Heat, Light, Water and Power	130.23
Chemical Supplies	1,195.03
Seeds, Plants and Sundry Supplies	624.60
Library	8.00
Tools, Implements and Machinery	33.00
Furniture and Fixtures	125.39
Scientific Apparatus	340.37
Traveling Expense	414.98
Buildings and Land	12.65
Total	\$ 30,000.00

c. State Station

RECEIPTS—

Balance July 1, 1920	\$ 9,078.64
From State Appropriation	106,853.80
Ground Water Receipts	761.85
Animal Husbandry Sales	15.30
Horticulture	214.68
Davis County Farm	2,453.45
Irrigation and Drainage	4,325.99
Soil Survey Sales	280.15
Ashley Valley Project Sales	3,686.25
Agronomy Sales	46.50
Entomology Sales	99.15
Arid Farm Sales	991.08
Panguitch Farm Sales	311.20
Total	\$129,118.04
Overdraft July 1, 1922	7,980.42
Grand Total	\$137,098.46

EXPENDITURES:

Ground Water Fund	\$ 1,765.18
Salaries	66,035.12
Labor	28,454.88
Publications	8,572.38
Postage and Stationery	1,796.57
Freight and Express	657.79
Heat, Light, Water and Power	6.85
Chemical Supplies	1,263.42
Seeds, Plants and Sundry Supplies	5,726.56
Fertilizers	406.90
Feeding Stuffs	4,367.19
Ground Water Fund	1,966.62
Library	305.34
Tools, Implements and Machinery	1,386.53
Furniture and Fixtures	532.66
Scientific Apparatus	1,101.17
Livestock	220.75
Traveling Expenses	7,590.50
Contingent Expenses	2,053.39
Building and Land	2,888.66
Total	\$137,098.46

d. Station Miscellaneous

RECEIPTS

Balance with Treasurer, July 1, 1920.....	\$ 8,272.21
Agronomy Department Sales	1,064.70
Animal Husbandry Department Sales	377.20
Horticulture Department Sales	405.42
Davis County Farm Sales	1,125.50
Greenville Farm Sales	1.50
Poultry Department Sales	4,897.04
Arid Farm Sales	657.78
Panguitch Farm Sales	684.41
Botany and Plant Pathology Department Sales.....	120.70
Field Crops Department Sales	35.45
Miscellaneous Sales	220.00
Total	\$ 17,861.91
Overdraft July 1, 1922	871.53
Grand Total	\$ 18,733.44

EXPENDITURES:

Salaries	\$ 4,585.62
Labor	6,103.36
Publications	498.62
Postage and Stationery	528.51
Freight and Express	138.38
Heat, Light, Water and Power	21.80
Chemical Supplies	387.06
Seeds, Plants and Sundry Supplies	1,686.39
Fertilizers	115.50
Feeding Stuffs	135.35
Library	349.48
Tools, Implements and Machinery	579.90
Furniture and Fixtures	106.83
Scientific Apparatus	156.76
Livestock	592.00
Traveling Expenses	2,093.26
Contingent Expenses	302.31
Building and Land	352.31
Total	\$ 18,733.44

Summary of Experiment Station

RECEIPTS:

Hatch Fund	\$ 30,000.00
Adams Fund	30,014.32
State Station Fund	129,118.04
Miscellaneous Fund	17,861.91
	<hr/>
..	\$206,994.27
Overdraft as shown above	8,837.63
	<hr/>
Total	\$215,831.90

EXPENDITURES:

Hatch Fund	\$ 30,000.00
Adams Fund	30,000.00
State Station Fund	137,098.46
Miscellaneous	18,733.44
	<hr/>
Total	\$215,831.90

5. STATE POWER PLANT

RECEIPTS:

State Appropriation	\$ 33,126.47
Miscellaneous Sales	35.85
	<hr/>
Total	\$33,162.32

EXPENDITURES:

Overdraft July 1, 1920	\$ 2,783.01
Salaries for Operation	11,099.88
Labor, Extra for Operation, etc.	2,392.04
Transmission Charges	14,073.57
Supplies, Oil, etc.	501.35
Repairs and Improvements	619.99
Telephone and Telegraph	166.50
Traveling Expense	51.54
Tools, Machinery, etc.	170.79
General Expense	165.78
Postage and Stationery	3.72
	<hr/>
	32,028.17
Balance July 1, 1922	\$ 1,134.15
	<hr/>
Total	\$33,162.32

B. COLLEGE INCIDENTAL FUND

RECEIPTS:

Balance on Hand July 1, 1920	\$ 356.48
Bookstore Sales, two years	56,111.45
Cafeteria Sales, two years	30,485.70
State Board Horse Commissioners	426.00
Gymnasium Fees, two years	4,439.53
Student Deposits (Laboratory)	4,946.75
1911 Class Loan Fund	4,830.88
Johansen Scholarship Fund	1,031.76
U. A. C. Faculty Women's League	259.26
1912 Class Locker Fund	607.00
Military Ball, two years	527.50
Creamery Sales, two years	22,670.60
Printing Department Sales	2,120.38
Plant Industry Building Apartments, rents	2,909.77
Total	<u>\$131,723.06</u>
Overdraft, July 1, 1922	584.97
Grand Total	<u>\$132,308.03</u>

EXPENDITURES:

Overdraft, July 1, 1920	\$ 6,332.60
Bookstore	58,524.50
Cafeteria	25,812.88
Cafeteria Balance paid to College	3,000.00
State Board Horse Commissioners	24.00
Gymnasium	3,991.39
Gymnasium Balance paid to College	448.14
Students' Deposits Refunded	4,099.55
Students' Deposits Balance paid to College	847.20
1911 Class Loan Fund	3,820.00
Johansen Scholarship Fund	685.00
U. A. C. Faculty Women's League	250.00
1912 Class Locker Fund	606.15
Military Ball	497.21
Creamery	19,209.32
Printing Department	1,695.89
Plant Industry Building Apartments	2,464.20
Total	<u>\$132,308.03</u>

C. STUDENT BODY ORGANIZATION

The following is a report of the Receipts and Expenditures of the U. A. C. Student Body Organization for the Two Years ending June 30, 1922.

	Receipts	Disbursements
Overdraft July 1, 1920	\$	\$ 755.50
Student Fees	17,983.97	40.00
Faculty Tickets Sold	887.00	
Football	14,858.09	18,092.06
Basketball	2,584.44	2,776.80
Baseball	54.20	128.40
Track	485.64	1,564.43
Student Body Dances	352.00	678.10
Student Life	2,109.42	5,455.76
Musicales	813.35	1,004.25
Dramatics	449.75	384.09
Lyceum Course	2,429.57	3,574.55
Miscellaneous Athletics	972.51	1,972.71
Debating	85.00	1,032.05
Wrestling	200.00	289.36
Athletic Banquet	111.00	341.57
Tennis		199.63
Swimming		92.30
Awards, Medals, Sweaters, etc.....		1,454.87
Miscellaneous Expenses		3,606.31
Balance		933.20
Total	\$ 44,375.94	\$ 44,375.94

D. RECAPITULATION, RECEIPTS AND EXPENDITURES**RECEIPTS:**

1. Regular Fund:		
(a) College Proper	\$	810,935.98
(b) Cedar City Branch		120,560.77
(c) Extension Division		195,102.00
(d) Experiment Station		206,994.27
(e) Power Plant		33,162.32
2. Incidental Fund		131,723.06
3. Student Body Fund Receipts		44,375.94
Overdraft as above		16,551.26
Total	\$	\$1,559,405.60

EXPENDITURES:

1. College Proper	821,991.18
(a) Cedar City Branch	133,655.32
(b) Extension Division	180,148.26
(c) Experiment Station	215,831.90
(d) Power Plant	32,028.17
2. Incidental Fund	132,308.03
3. Student Body Fund Cost	43,442.74
Total	\$1,559,405.60

PROOF

IN HANDS OF BANKS:

Cache Valley Banking Company, overdraft per record	
pp. 271	\$ 9,871.92
Thatcher Brothers Banking Company, overdraft per record	
pp. 271	16,852.36
Total Bank Overdraft	26,724.28
Less cash on hand per record pp. 271.....	10,173.02
Net overdraft as shown above.....	\$16,551.26

INVENTORIES

(Not including Supplies and Land Grant)

June 30, 1922

I—The College:

Land and Water Rights, 187 acres	
@ \$300.00 per acre	56,100.00
Buildings and Fixed Equipment ..	1,179,600.00
Main Building	\$300,000.00
Boiler House	60,000.00
Gymnasium	90,000.00
Chemistry Building	100,000.00
Experiment Station	4,000.00
Mechanic Arts Building	50,000.00
Women's Building	50,000.00
Agricultural Engineering Bldg.	100,000.00
Plant Industry Building	150,000.00
New Livestock Building	100,000.00
State Power Plant	80,000.00
Transformer House and Sub-	
station	4,000.00
Seed House	2,500.00
Vegetation House	2,000.00
Residences	14,500.00
President's	\$ 5,000.00
Director's	3,000.00
Agronomist's	2,000.00
Three Workman's	
Cottages	4,500.00
Farm Buildings	40,200.00
Horse Barn	6,500.00
Cattle Barn	10,000.00
Sheep Barn	6,000.00
Piggery Barn	1,700.00
Poultry House ..	4,700.00
Stock Judging Pa-	
vilion	5,300.00
Tie Shed and Fenc-	
ing	3,000.00
Granary	3,000.00

Carpentry Repair Shop	1,500.00	
Conservatory	6,000.00	
Fixed Equipment	24,900.00	
Sewer System ...	6,000.00	
Water Works ...	18,000.00	
Office Equipment	900.00	
General Equipment		224,357.20
Offices	6,946.05	
President's Office.	3,978.25	
Secretary's Office.	2,260.80	
Registrar's Office	707.00	
Departments of Instruction	158,748.72	
Accounting & Bu- siness Practice.	4,224.25	
Agronomy	1,978.50	
Animal Husbandry	12,190.90	
Art	1,925.82	
Bacteriology	3,586.12	
Botany and School of Agriculture..	4,391.50	
Business Adminis- tration	407.00	
Correspondence Study	292.33	
Chemistry	6,353.75	
Dairying	17,647.03	
Economics	163.50	
Household Admin- istration	638.30	
Carpenter Shop ..	7,866.75	
Engineering	5,163.65	
English	432.00	
Farm Foreman ..	2,144.35	
Farm Machinery .	10,332.72	
Horticulture	782.78	
Green House	11,657.20	
History	196.50	
Irrigation	845.24	
Mathematics	519.00	
Military	556.05	
Modern Languages	28.50	
Music	3,483.45	
Geology and Min- eralogy	1,992.65	
Physics	7,653.51	
Competitive Ath- letics	969.85	
Physical Education	6,941.02	
Veterinary Science	731.30	
Zoology and Ento- mology	8,197.75	
Poultry Laboratory	420.92	
Medical Supervi- sion	387.94	
Machine Shop M. A. Building....	13,117.05	
Mechanical Draw- ing	1,028.00	

Forging	6,406.89	
Foods and Diet- etics	8,380.17	
Textiles and Cloth- ing	2,764.05	
Practice House ..	713.05	
Range M a n a g e - ment	255.50	
Rest Room	616.38	
Publicity—Print & Information Ser- vice	301.50	
Public Speaking..	64.00	
Miscellaneous Equipment		58,662.43
Library	27,577.46	
Janitorial	5,147.03	
Construction, Re- pairs, and Plumbing	2,989.75	
Cafeteria	4,896.90	
Bookstore M e r - chandise	9,205.45	
U. A. C. Practice Farm	8,845.84	
Total		\$1,460,057.20

II—Branch Agricultural College, Cedar
City Land—Campus (46 acres @
\$500.00 per acre)

\$ 23,000.00

Arid Farm (80 Acres @ \$50.00)

4,000.00

Buildings and Field Equipment ..

223,650.12

Library Building	\$ 60,000.00
Science Building	75,000.00
Mechanic Arts Building	15,000.00
Auto Shop Building	4,000.00
Boiler House and Heating Plant	15,000.00
Sheds and Yards	6,000.00
Camp House	500.00
Live Stock	6,734.00
Farm Equipment	3,752.00
Dairy Equipment	1,729.95
Agricultural and Biological Ap- paratus	1,516.54
Auditorium Halls, Club Rooms and Class Rooms	2,776.90
Secretary—Registrar's Office..	278.05
Library Building Class Rooms..	790.80
Principal's Office	812.00
Department of Chemistry.....	2,442.02
Mineralogy	183.00
Department of Physics	1,188.55
Music Department	4,010.50
Domestic Science Department...	2,355.22
Domestic Art Department.....	1,535.95
Gymnasium Department.....	740.35
Janitor's Equipment	184.35
Commercial Department	2,657.00
Art Department	393.00
Woodwork Shops	4,116.55
Mechanical Drawing Department	248.00
Forge Machine and Auto Shops	7,695.61
Library Equipment	1,732.91
Library Purchases	276.87

Total B. A. C.....

\$ 250,350.12

III—Extension Division:

General Equipment		\$ 5,507.60
Logan Offices	4,720.12	
Civic Center, Salt Lake City....	10.50	
Equipment with Home Demon- strators	123.53	
Box Elder County	\$10.50	
Cache County ...	13.25	
Davis County	14.00	
Sanpete County ..	12.00	
Salt Lake County.	10.00	
Summit County ..	12.00	
Utah County	20.00	
Weber County ..	16.50	
Nutrition Project	15.28	
Equipment with County Agricul- tural Agents	653.45	
Beaver County ..	54.00	
Box Elder County.	15.50	
Carbon County ..	12.00	
Davis County	21.60	
Emery County ..	20.00	
Piute County	35.00	
Juab County	30.00	
Millard County ..	5.00	
Iron County	14.00	
Salt Lake County	30.50	
Sanpete County ..	74.00	
Sevier County ...	50.00	
Tooele County ..	5.00	
Uintah County ...	50.00	
Utah County	46.35	
Washington County	50.00	
Weber County ..	44.50	
Dairy Specialist..	7.00	
Irrigation	89.00	
Total Extension Division		\$ 5,507.60

IV—Experiment Station:

General Equipment		36,989.63
Offices	3,550.25	
Director's	686.00	
Secretary's	184.00	
Clerk's	331.75	
Library	1,537.00	
Basement	12.50	
Mailing Room...	119.00	
Calculating Machine	680.00	
Departments	33,439.38	
Agronomy ..	2,199.70	
Chemistry & Bacteriology	9,825.96	
Horticulture	1,117.39	
Poultry	5,242.60	
Zoology and Entomology	1,594.00	
Range Management	647.05	
Photographic	3,608.30	
Nephi Substation.	1,995.75	
Irrigation	4,817.08	
Greenville Farm .	830.15	
Human Nutrition.	1,561.40	
Arid Farms, Buildings and Equipment		2,207.70
Panguitch Farm—Equipment....		5,347.84
Total Experiment Station		44,545.17
Grand Total		\$1,760,760.09

V. REPORT OF THE FIRE INSURANCE CARRIED BY THE UTAH AGRICULTURAL COLLEGE

The following fire insurance is carried on the buildings by the State Department of Finance and Purchase on a blanket policy covering all state property.

	Building	Contents
Main	\$240,000.00	\$ 40,000.00
Experimental	3,200.00	1,600.00
Women's	40,000.00	8,000.00
Gymnasium	72,000.00	4,800.00
Heating Plant	8,000.00	40,000.00
Mechanic Arts	40,000.00	40,000.00
Engineering	80,000.00	5,600.00
Livestock	80,000.00	4,800.00
Plant Industry	120,000.00	6,400.00
Chemistry	80,000.00	16,000.00
Auto Laboratory	800.00	9,600.00
Transformer	3,200.00	4,000.00
Repair and Machine Shop	1,600.00	1,600.00
Greenhouse	3,600.00	2,400.00
President's Dwelling	4,000.00	
Director's Dwelling	2,400.00	
Agronomist Dwelling	1,600.00	
(3) Employee's Dwellings	3,600.00	
Stock Judging Pavilion	4,240.00	
Cattle Barn	8,000.00	9,600.00
Sheep Barn	4,800.00	480.00
Sheep Sheds	400.00	
Cattle Sheds	400.00	
Granary No. 1	2,400.00	640.00
Hog Pens	1,360.00	
Horse Barn	5,200.00	1,200.00
Auto and Wagon Shed	1,600.00	4,000.00
Poultry Houses	7,200.00	3,200.00
Storage Shed and Granary	1,600.00	
Carpenter Shop	800.00	
Practice House		800.00
Fences	2,400.00	
Total	\$824,400.00	\$204,720.00

I hereby certify that the above is a true and correct copy of the Financial Condition of the College, and of the Receipts and Disbursements of same for the Biennium ending June 30, 1922. I further certify that the books have been well kept, that the report agrees with same, and that proper duplicate receipts and vouchers are on hand for all Receipts and Disbursements.

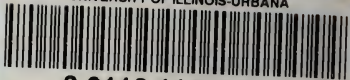
Very respectfully submitted,

JOHN L. COBURN,

Secretary.

THE LIBRARY OF THE
MAR 9 1931
UNIVERSITY OF ILLINOIS.

UNIVERSITY OF ILLINOIS-URBANA



3 0112 112032211